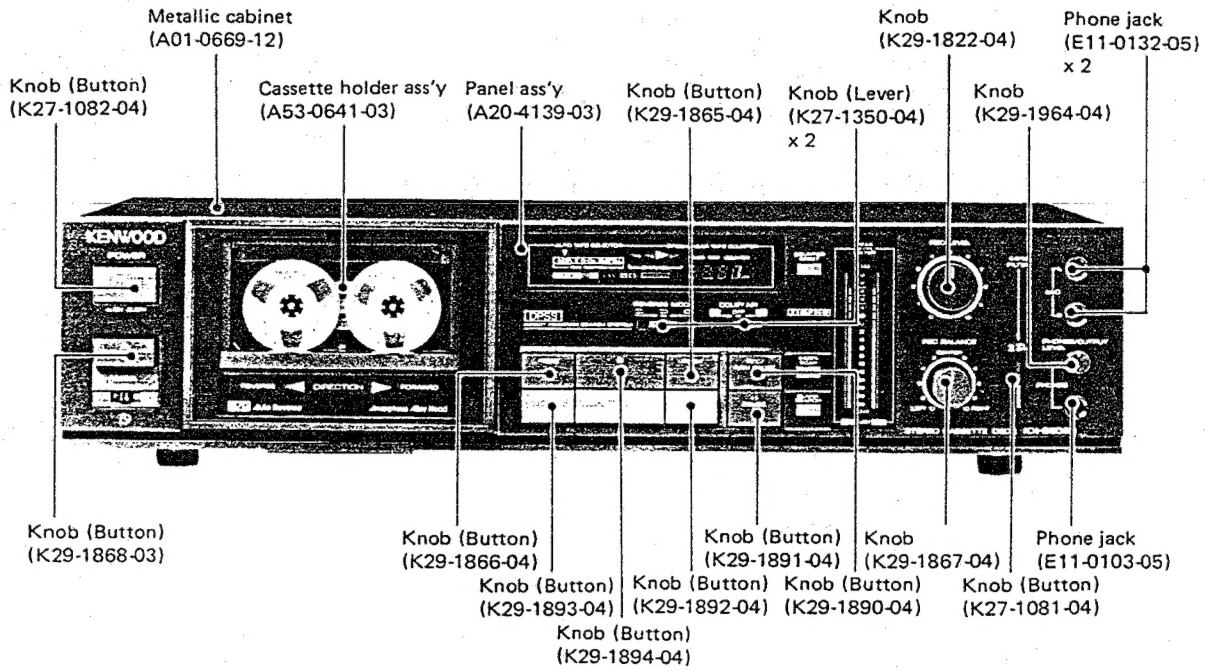
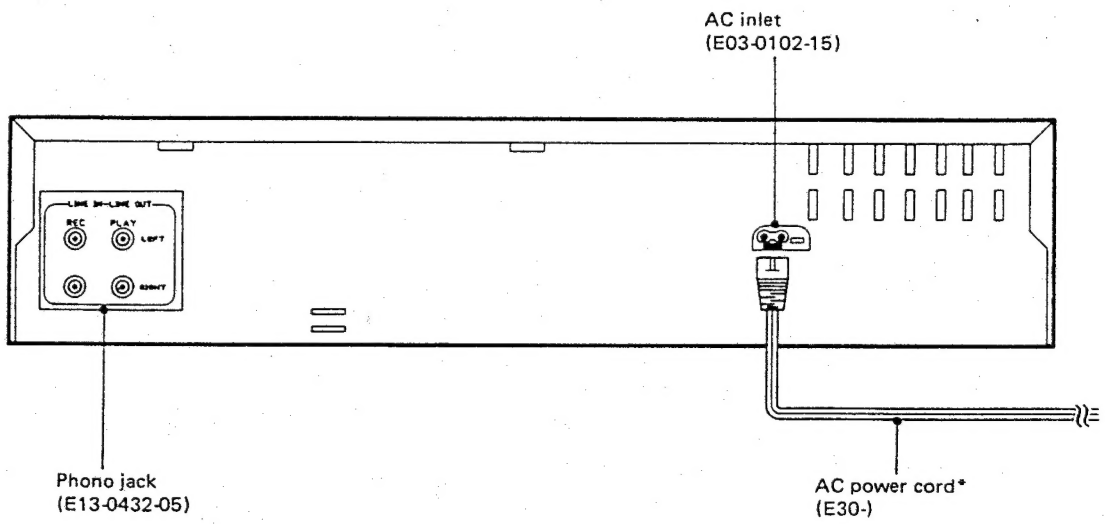
SERVICE MANUAL

KENWOOD **KX-990SR**

STEREO CASSETTE TAPE DECK

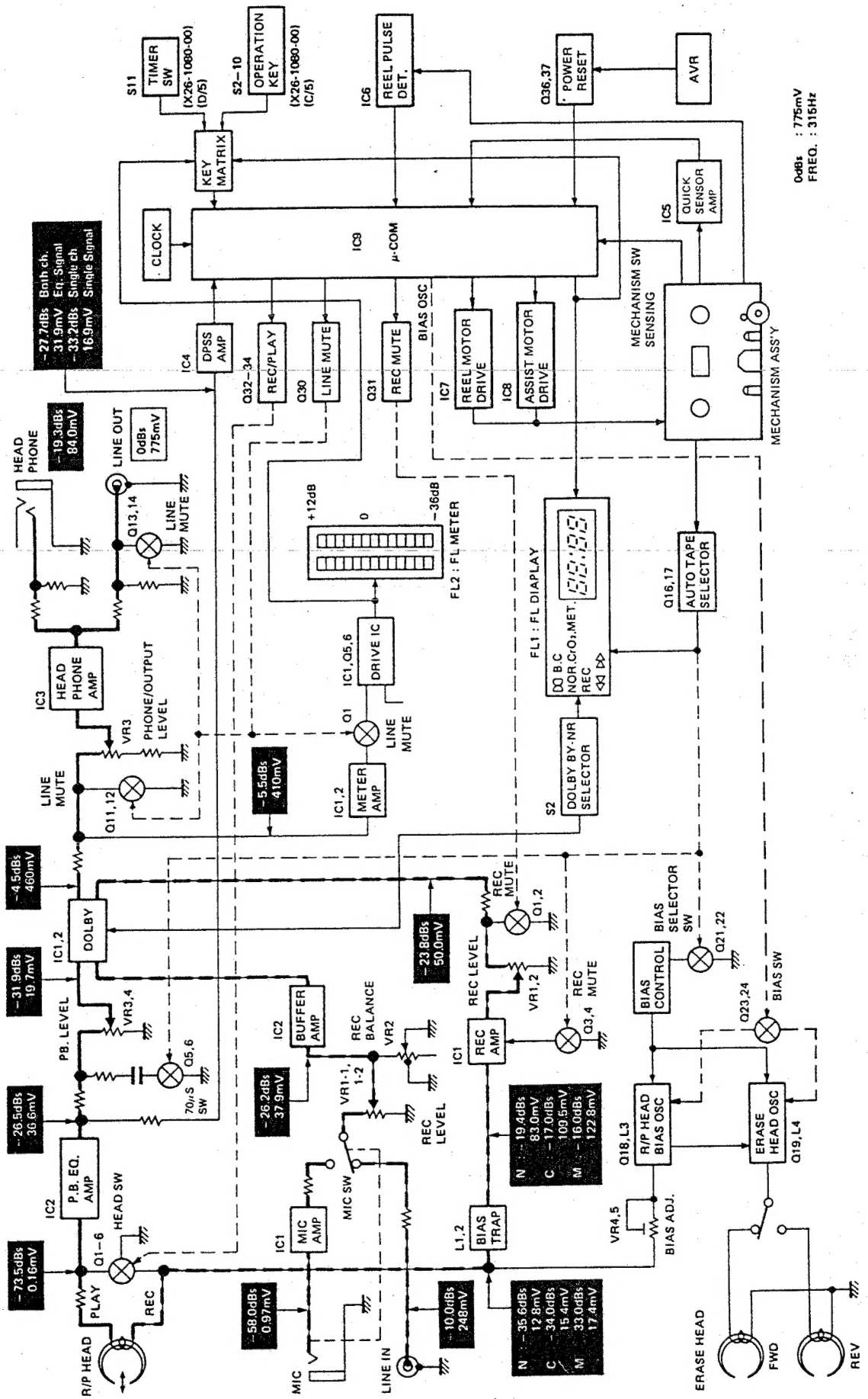




* Refer to parts list on page 20.

NOTE : Make sure to turn the power off before disconnecting the wires from the cassette mechanism when removing the mechanism for repair.
If not, the mechanism will lock itself up and cannot be reset.

BLOCK LEVEL DIAGRAM



CIRCUIT DESCRIPTION

Operation of active elements

METER AMP (X87-1020-00)

Element	Application/function	Operation/conditions
IC1	1/2 multiply compression amp	With respect to the AC input signal, the DC voltage proportional to 1/2 is output.
IC2	DC amp	Amplifies the voltage output from IC1 to the necessary level.
Q1	Meter muting switch	Turns off in PLAY, REC and REC PAUSE modes, and turns on in other modes. (including PLAY PAUSE mode).

REC/PLAY (X87-1030-00)

Element	Application/function	Operation/conditions
IC1	Recording equalizer amp (Equalizer select switch for CrO_2 and Metal tape is in corporated.)	
IC2	Playback equalizer amp	
Q1,2	REC muting switch	Turn off in REC mode only, and turn on in other modes (including REC PAUSE mode.)
Q3,4	Equalizer select switch for Metal tape	Turn off in Metal tape mode, and turn on in Normal and CrO_2 tape modes.
Q5,6	Playback equalizer select switch	Turn off in Normal tape mode (120μs) and turn on in CrO_2 and Metal tape modes (70μs).

CASSETTE (X26-1080-11)

Element	Application/function	Operation/conditions
IC1	Mic amp	
IC2	MPX buffer amp	
IC3	Headphone amp	
IC4	DPSS amp	
IC5	Quick sensor amp	Turns on or off by the signal from the photo-coupler for quick sensor. At the tape end when the tape shifts from the magnetized portion to the leader tape portion, turns on momentarily.
IC6	Revolution detection amp	When this IC obtains the switching signal from the photo-couplers of both reel pads in accordance with their speed, pulse is generated at the leading and trailing edges.
IC7	Reel motor drive	
IC8	Assist motor drive	
IC9	Microcomputer	
Q1~4	Head select switch	Turn off in REC, REC PAUSE modes, and turn on in other modes. High withstand voltage, appropriately low saturation voltage, and low ON resistance are required.
Q5,6	Head select switch	Turn on in REC, and REC PAUSE modes, and turn off in other modes. (These are complementary with Q1~4.) In the same unit, the same type of transistors as Q1~4 should be used.
Q7	+ 7.6V power supply	Stabilized power supply for the Dolby circuit.
Q8	−7.6V power supply	Stabilized power supply for the Dolby circuit.
Q9	+ 7.6V power supply	Stabilized power supply for the playback equalizer amp.
Q10	−7.6V power supply	Stabilized power supply for the playback equalizer amp.
Q11~14	Line out mute switch	Turn off in PLAY, REC, REC PAUSE modes and turn on in other modes (including PLAY PAUSE mode.)
* Q15	DPSS input sensitivity select switch	Turns on in PLAY, REC, and REC PAUSE modes, and turns off in other modes (including PLAY PAUSE mode.) Since this switch turns on in PLAY search mode, the bypass filter connected to this switch is introduced to the inverting input terminal of the DPSS amp with the result that input sensitivity increases. In CUE & REVIEW mode, the opposite to the above is true with the result that input sensitivity decreases.
Q16,17	Auto tape select control	<table><tr><td></td><td>Normal</td><td>CrO_2</td><td>Metal</td></tr><tr><td>Q16</td><td>OFF</td><td>OFF</td><td>ON</td></tr><tr><td>Q17</td><td>OFF</td><td>ON</td><td>OFF</td></tr></table>
* Q18	For bias oscillation	Drives the primary winding of the bias oscillation transformer.
Q19	For erase oscillation	Drives the primary winding of the erase oscillation transformer.
Q20	Oscillator power supply	

CIRCUIT DESCRIPTION

Element	Application/function	Operation/conditions
Q21,22	Bias oscillator level select switches	<table><tr><td></td><td>Normal</td><td>CrO_2</td><td>Metal</td></tr><tr><td>Q21</td><td>ON</td><td>OFF</td><td>OFF</td></tr><tr><td>Q22</td><td>OFF</td><td>ON</td><td>OFF</td></tr></table>
Q23,24	Bias ON/OFF switches	<table><tr><td></td><td>REC, REC PAUSE modes</td><td>Other modes</td></tr><tr><td>Q23</td><td>OFF</td><td>ON</td></tr><tr><td>Q24</td><td>ON</td><td>OFF</td></tr></table>
Q25	Direction switch detection switch	Turns on in forward mode and turns off in reverse mode.
Q26	Direction switch input controller	The base of this transistor is controlled by pin 29 of the microcomputer and the direction of the direction switch is input to pin 31 of the microcomputer as necessary.
Q27	Quick sensor input controller	The base of this transistor is controlled by pin 29 of the microcomputer, and the voltage output from the quick sensor is input to pin 30 of the microcomputer.
Q28	Voltage shift	The high level voltage is shifted to + 5V.
Q29	Reel motor drive Applied voltage controller	Turns on in PLAY mode, and the potential at pin 4 of IC7 becomes about 3.9V. Turns off in other modes, and the potential at pin 4 of IC7 becomes 5.4V~6.0V.
Q30	Line out mute switch controller	Turns off in PLAY, REC, and REC PAUSE modes, and turns on in other modes (including PLAY PAUSE mode.) Turns on when power is switched on or off.
Q31	REC mute switch controller	Turns off in REC mode, and turns on in other modes (including REC PAUSE mode.) Turns on when power is switched on or off.
Q32~34	REC/PLAY select switch controllers	Q33 and Q34 turn on in REC, and REC PAUSE modes, and Q32 turns off. In other modes, Q33 and Q34 turn off, and Q32 turns on.
Q35	+ 7.6V power supply	Stabilized power supply for the REC/PAUSE select switch controller and auto tape select control circuit.
Q36,37	Power on/off microcomputer reset	
Q38	+ 5V power supply	Stabilized power supply for the microcomputer, and high voltage, of the FL display circuit.
Q39	+ 10V power supply	Stabilized power supply for the recording equalizer amp, headphone amp, and DPSS amp.
Q40,41	+ 12V power supply	Stabilized power supply for the motors (capstan, reel, and assist.)
Q42	Constant current	
Q43	−10V power supply	Stabilized power supply for the recording equalizer amp, headphone amp, and DPSS amp.
Q44	Constant voltage	
Q45	−18.5V power supply	Stabilized power supply for the low voltages of the FL display circuit.
Q46	Q45 controller	
Q47	Constant current	
Q48	Constant current	
Q49	Constant current	

DISPLAY (X25-2250-00)

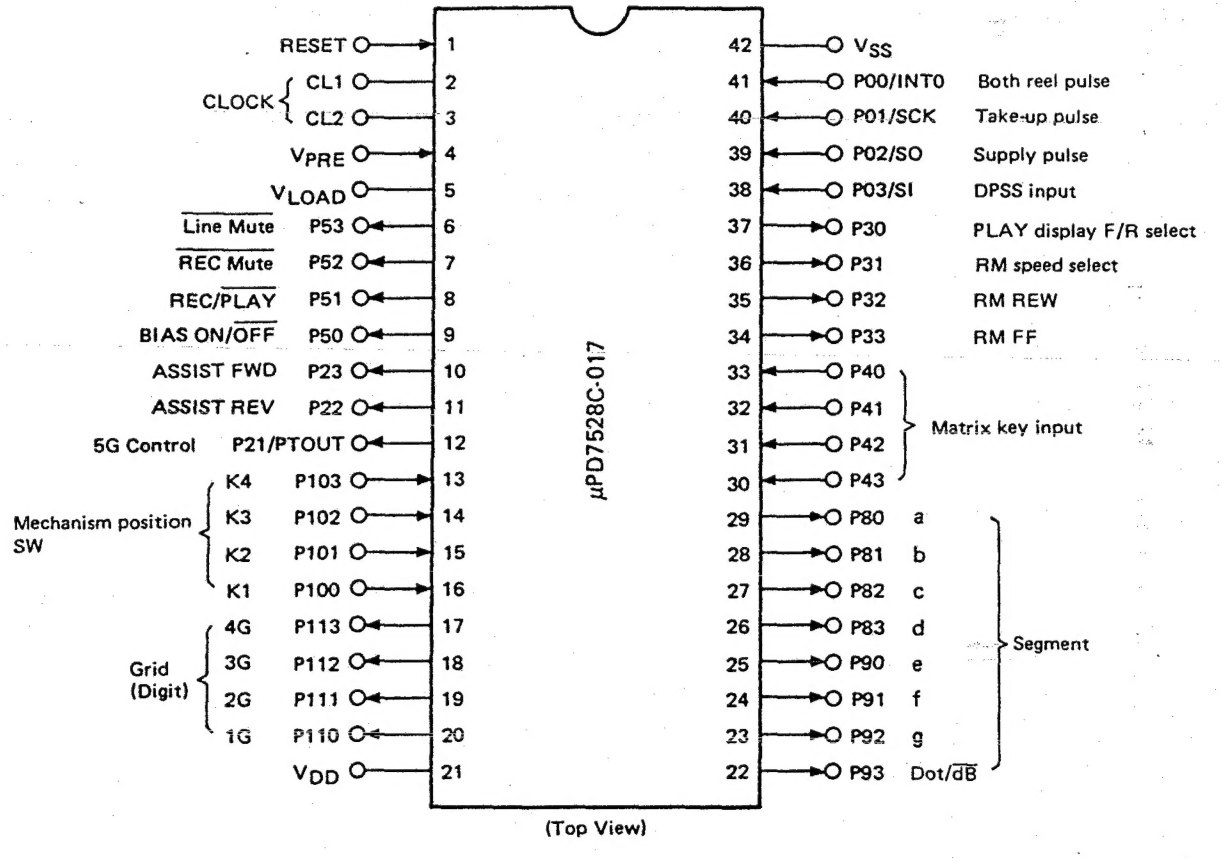
Element	Application/function	Operation/conditions
TC1	Level meter driver	2-channel dynamic drive.
Q1	FL display driver	By adding the 1~4 digit control pins of the microcomputer, this driver lights " OPERATION " in dynamic mode.
Q2	FL display driver	This lights " ◀ " in dynamic mode.
Q3	FL display driver	This lights " ▶ " in dynamic mode.
Q4	PLAY FWD/REV select detection switch	<table><tr><td>Control voltage of pin 37 of the microcomputer</td><td>FWD (−18.5V)</td><td>REV (+ 4.5V)</td></tr><tr><td>Q4</td><td>OFF</td><td>ON</td></tr></table>
Q5,6	Peak hold reset	Q5 and Q6 comprise the flip-flop circuit. At 3 sec intervals, Q6 turns on momentarily, then resets.

CIRCUIT DESCRIPTION

DOLBY NR (X30-1140-00)

Element	Application/function	Operation/conditions
IC1,2	Dolby B-C amp	
Q1~4	MPX filter switches	These are controlled by the MPX filter switch (S1), and when S1 is on, Q1~4 are on the filter is on, too.

Pin configuration and pin functions of IC9 : μPD7528C-017



(Top View)

NOTE : For details of the matrix, refer to page 8.
RM : Reel motor
ASSIST : Assist motor

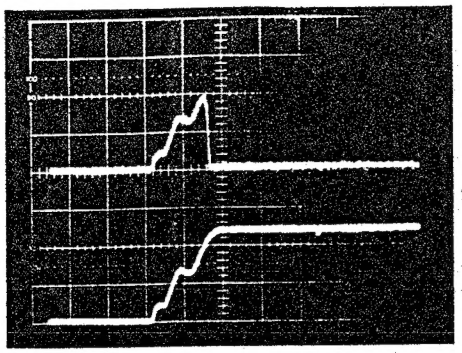
CIRCUIT DESCRIPTION

Pin functions of μPD7528C-071

Pin No.	Pin name	Input/Output	Function
1	RESET	Input	Active high. Pulse is generated when power is switched on or off (refer to photos 1 and 2.)
2	CL1	Input	Internal clock input by means of CR.
3	CL2	–	Internal clock input by means of CR.
4	VPRE	Input	Pre-driver power supply for high withstand voltage output, –4V.
5	VLOAD	Input	Pin for pulling down internal load resistance, –26V.
6	P53	Output	Active low. Line mute control signal pin.
7	P52	Output	Active low. Rec mute control signal pin.
8	P51	Output	REC/PLAY select output control signal pin.
9	P50	Output	Bias ON/OFF control signal pin.
10	P23	Output	Assist motor drive forward direction.
11	P22	Output	Assist motor drive reverse direction.
12	P21	Output	5th digit control pin.
13	P103	Input	Mechanism position switch K4.
14	P102	Input	Mechanism position switch K3.
15	P101	Input	Mechanism position switch K2.
16	P100	Input	Mechanism position switch K1.
17	P113	Output	Active high. FIP 4th digit control pin.
18	P112	Output	Active high. FIP 3rd digit control pin.
19	P111	Output	Active high. FIP 2nd digit control pin.
20	P110	Output	Active high. FIP 1st digit control pin.
21	VDD	–	+ 5V
22	P93	Output	Active high. FIP segment dot control pin.
23	P92	Output	Active high. FIP segment g control pin.
24	P91	Output	Active high. FIP segment f control pin.
25	P90	Output	Active high. FIP segment e control pin.
26	P83	Output	Active high. FIP segment d control pin.
27	P82	Output	Active high. FIP segment c control pin.
28	P81	Output	Active high. FIP segment b control pin.
29	P80	Output	Active high. FIP segment a control pin.
30	P43	Input	Matrix key input.
31	P42	Input	Matrix key input.
32	P41	Input	Matrix key input.
33	P40	Input	Matrix key input.
34	P33	Output	Reel motor FF output.
35	P32	Output	Reel motor REW output.
36	P31	Output	Reel motor speed select.
37	P30	Output	FWD/REV PLAY display select.
38	P03	Input	Non-recorded portion detection pin for the DPSS.
39	P02	Input	Supply side reel pulse.
40	P01	Input	Take-up side reel pulse.
41	P00	Input	Active high. Used as external interrupt pin. Edges of both reel pulses are detected. (refer to photos 3 and 4.)
42	VSS	–	GND

CIRCUIT DESCRIPTION

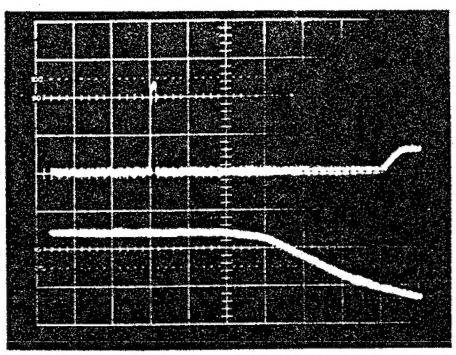
Waveform at RESET pin (pin 1) when power is switched on



Upper : Reset waveform
Lower : V_{DD} waveform
x : 0.2s/div
y : 2V/div

Photo.1

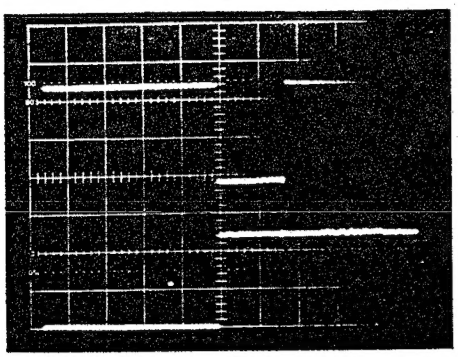
Waveform at RESET pin (pin 1) when power is switched off



Upper : Reset waveform
Lower : V_{DD} waveform
x : 50ms/div
y : 2V/div

Photo.2

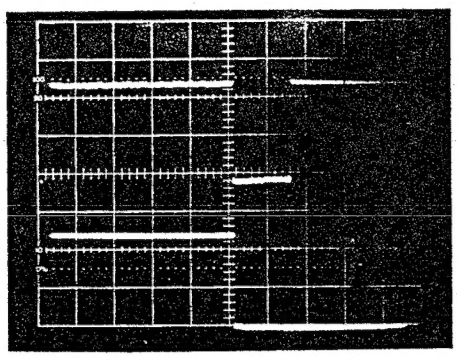
Leading edge of the takeup reel pulse (pins 40 and 41)



Upper : P00/INT0 both reel pulse edge detector
Lower : P01 takeup reel pulse
x : 20μs/div
y : 2V/div

Photo.3

Trailing edge of the takeup reel pulse (pins 40 and 41)



Upper : P00/INT0 both reel pulse edge detector
Lower : P01 takeup reel pulse
x : 20μs/div
y : 2V/div

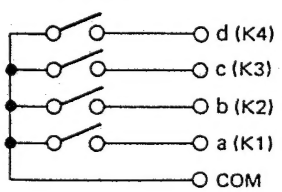
Photo.4

Mechanism position sensor switch positions

		REVERSE			⟷	STOP	⟷	FF/REW	⟷	FOWARD		
		PLAY	⟷	PAUSE						PAUSE	⟷	PLAY
ROTARY SW	a (K1)	ON	ON	ON	–	–	–	–	–	ON	ON	–
	b (K2)	–	–	ON	ON	ON	ON	–	–	–	ON	ON
	c (K3)	ON	–	–	–	ON	ON	ON	–	–	–	–
	d (K4)	–	–	–	–	–	ON	ON	ON	ON	ON	ON
	Code	10	14	12	13	9	1	3	7	6	4	5
Head direction switch	Reel	OFF	OFF	OFF	OFF ← ON OFF →	ON/OFF	ON/OFF	ON/OFF	← ON OFF → ON	ON	ON	ON

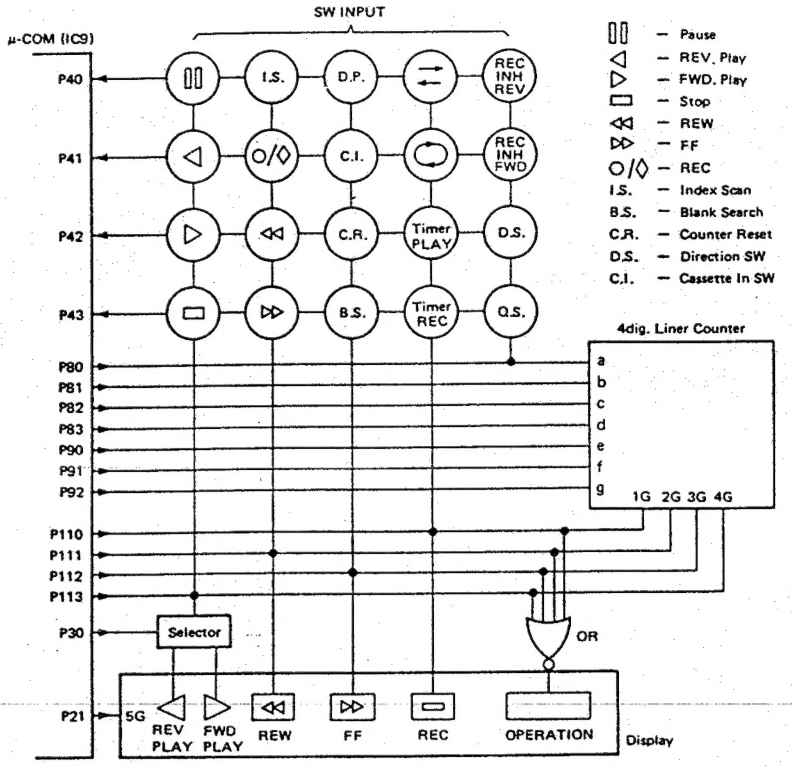
NOTE : The rotary switch code indicates "ON" for "0" and "OFF" for "1"

Rotary circuit

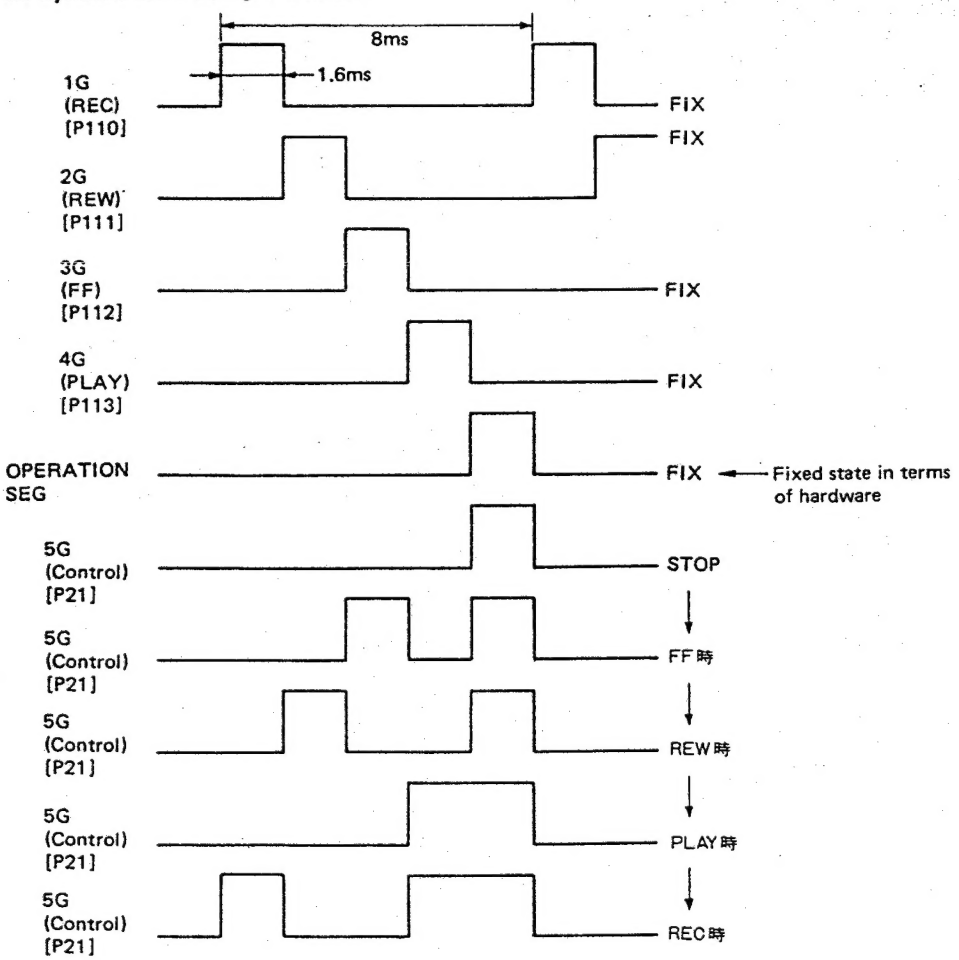


CIRCUIT DESCRIPTION

Key matrix



Timing diagram of the dynamic drive (4-digit counter)

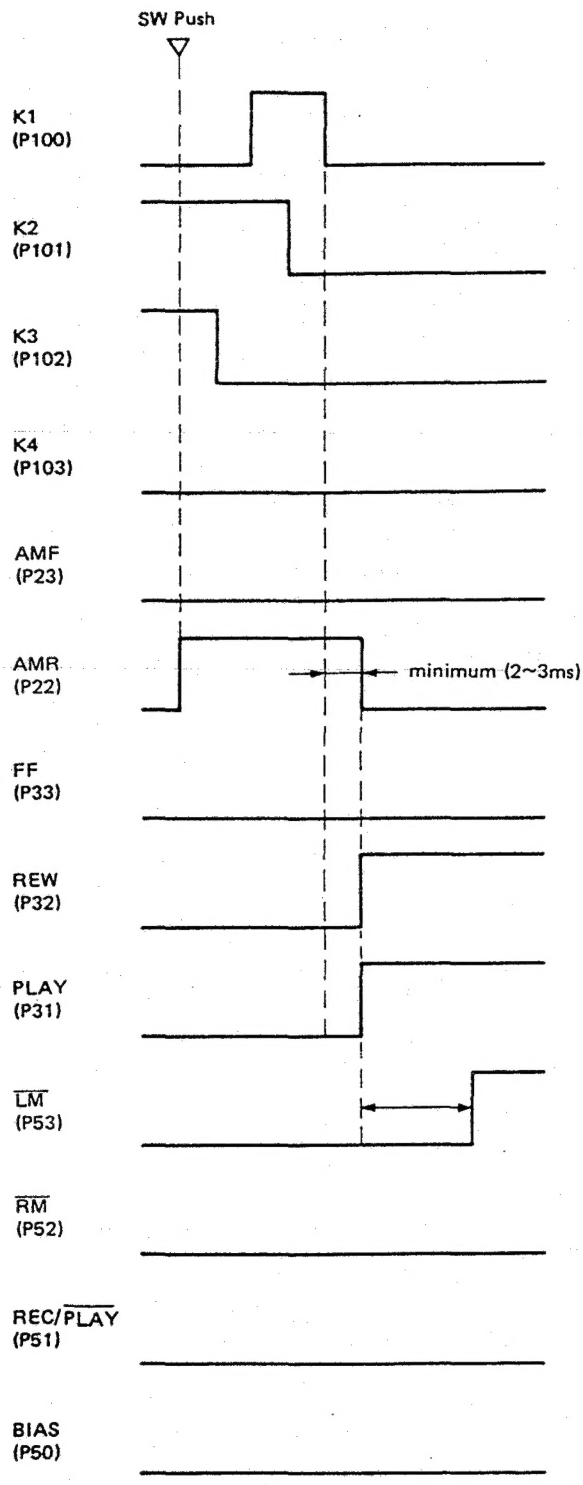


CIRCUIT DESCRIPTION

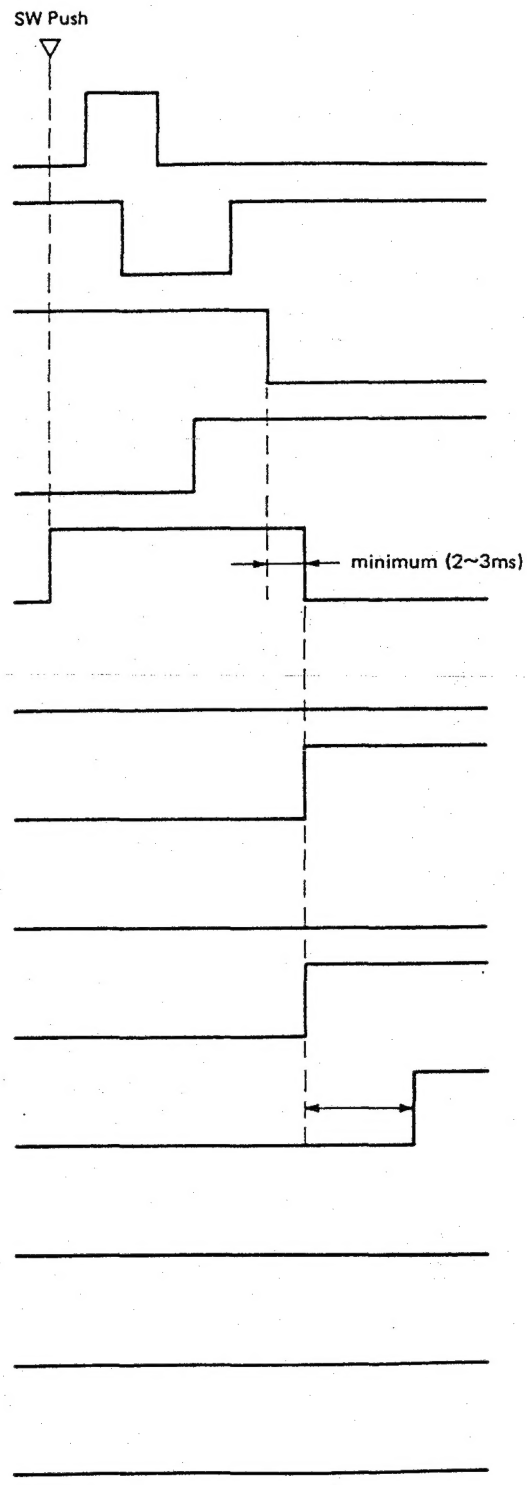
AMF . . . . . Assist motor forward
AMR . . . . . Assist motor reverse
LM . . . . . Line mute
RM . . . . . Rec mute

Operation timing diagram

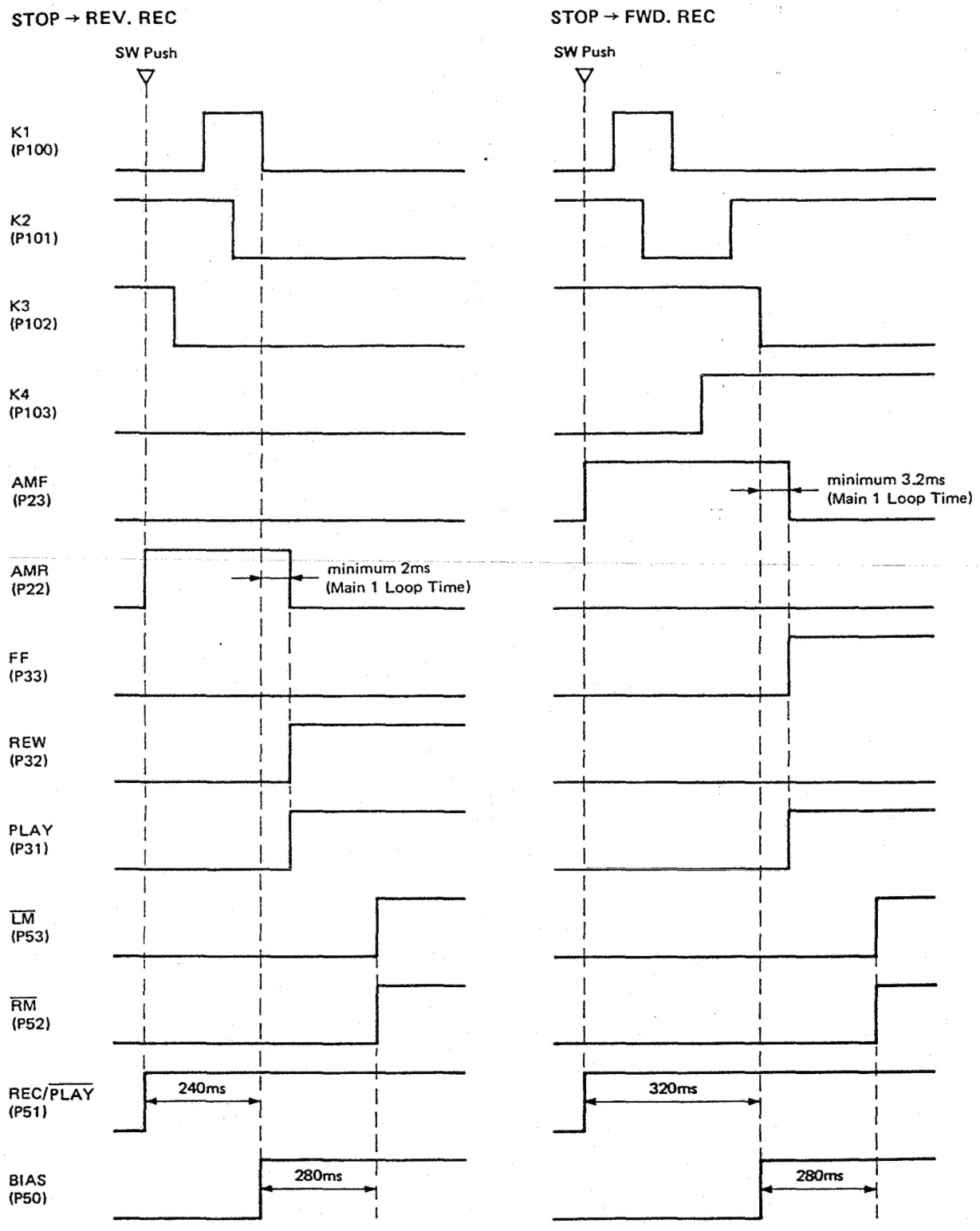
STOP → REV. PLAY



STOP → FWD. PLAY

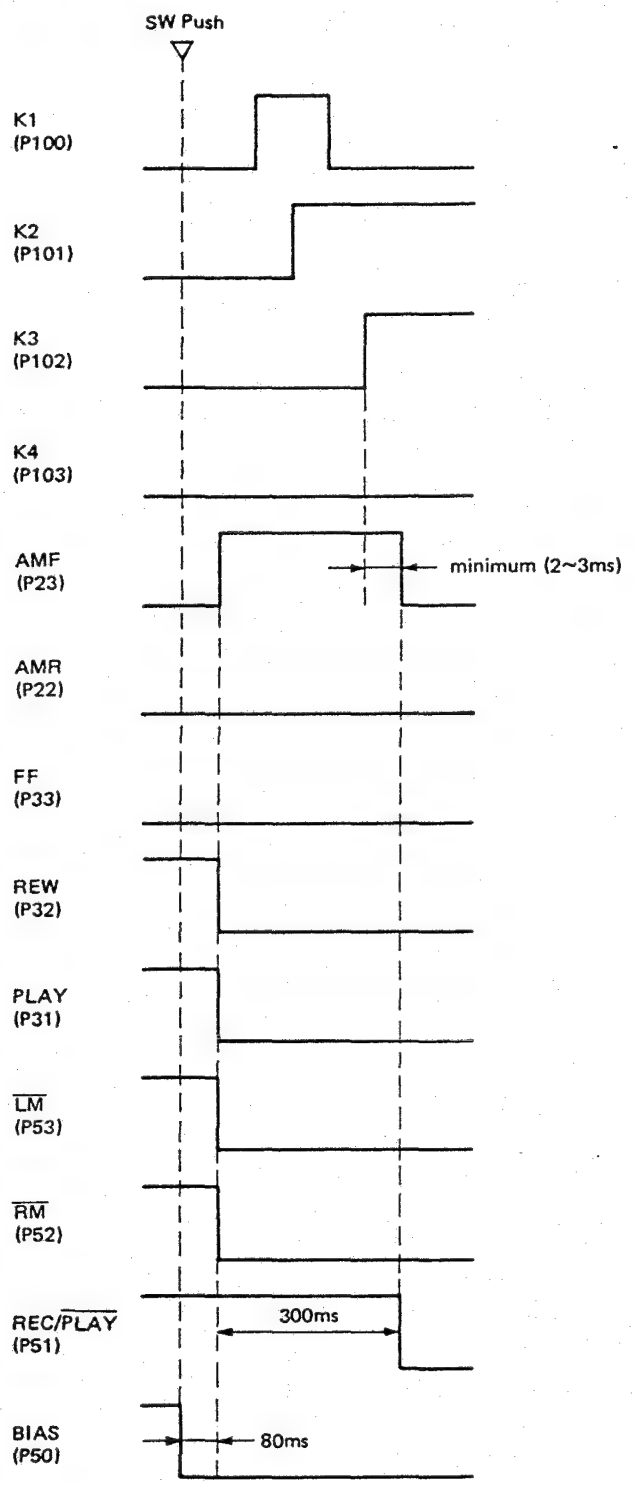


CIRCUIT DESCRIPTION

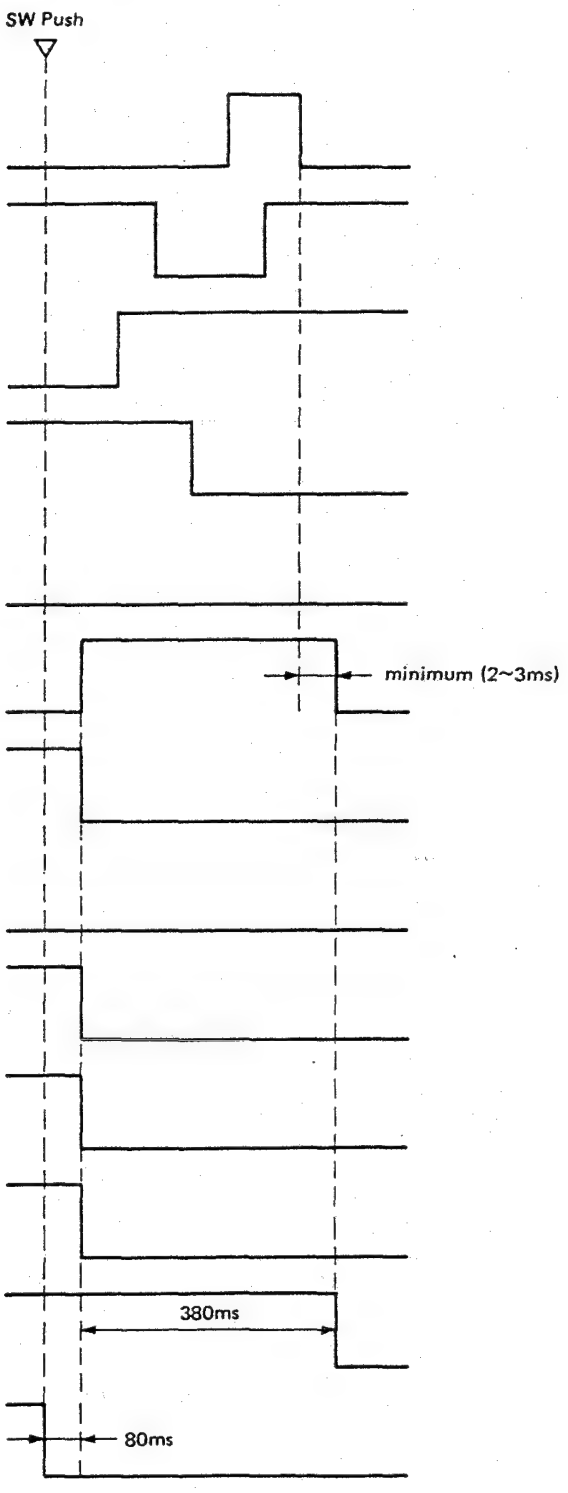


CIRCUIT DESCRIPTION

REV. REC → STOP

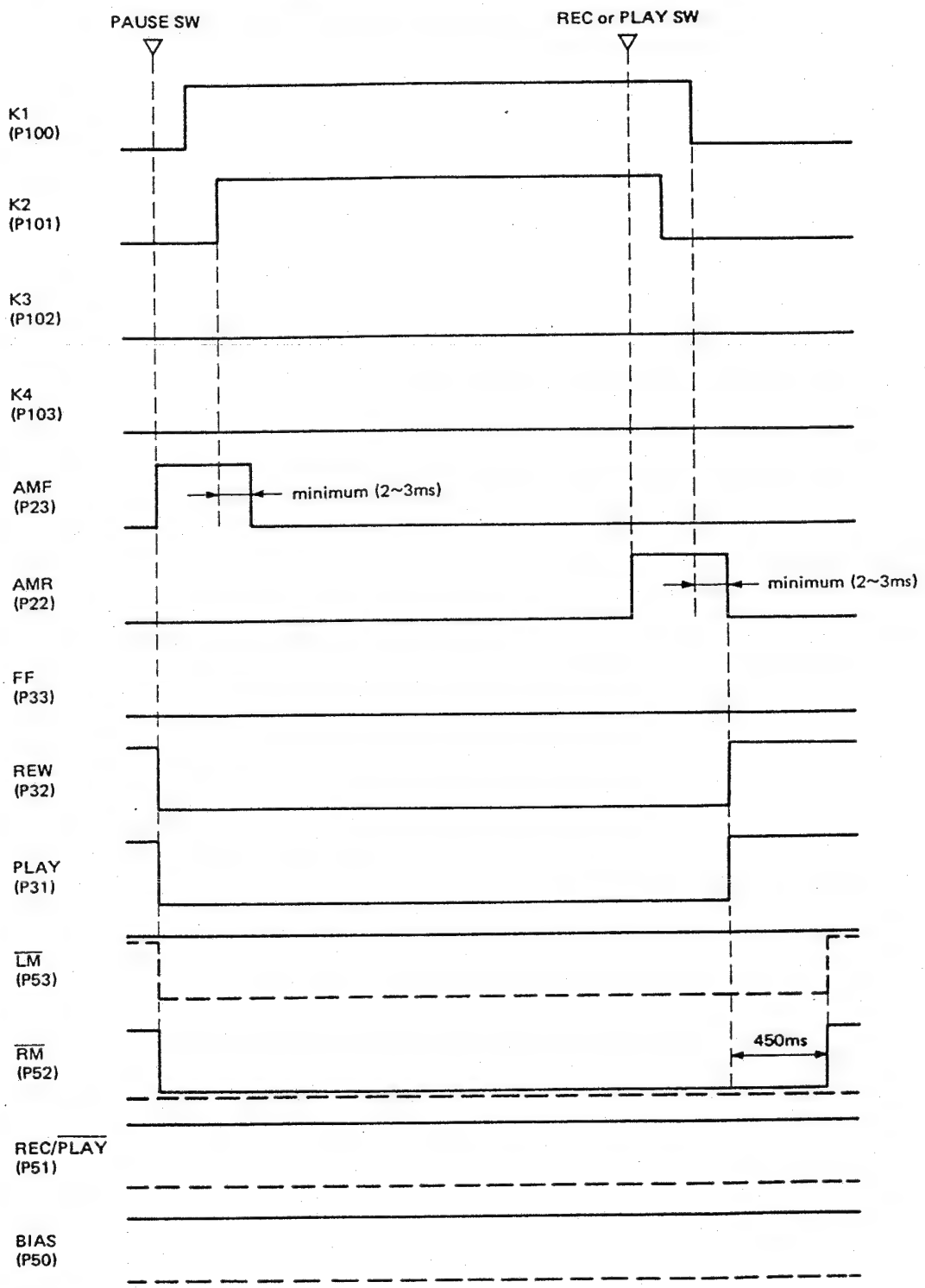


FWD. REC → STOP



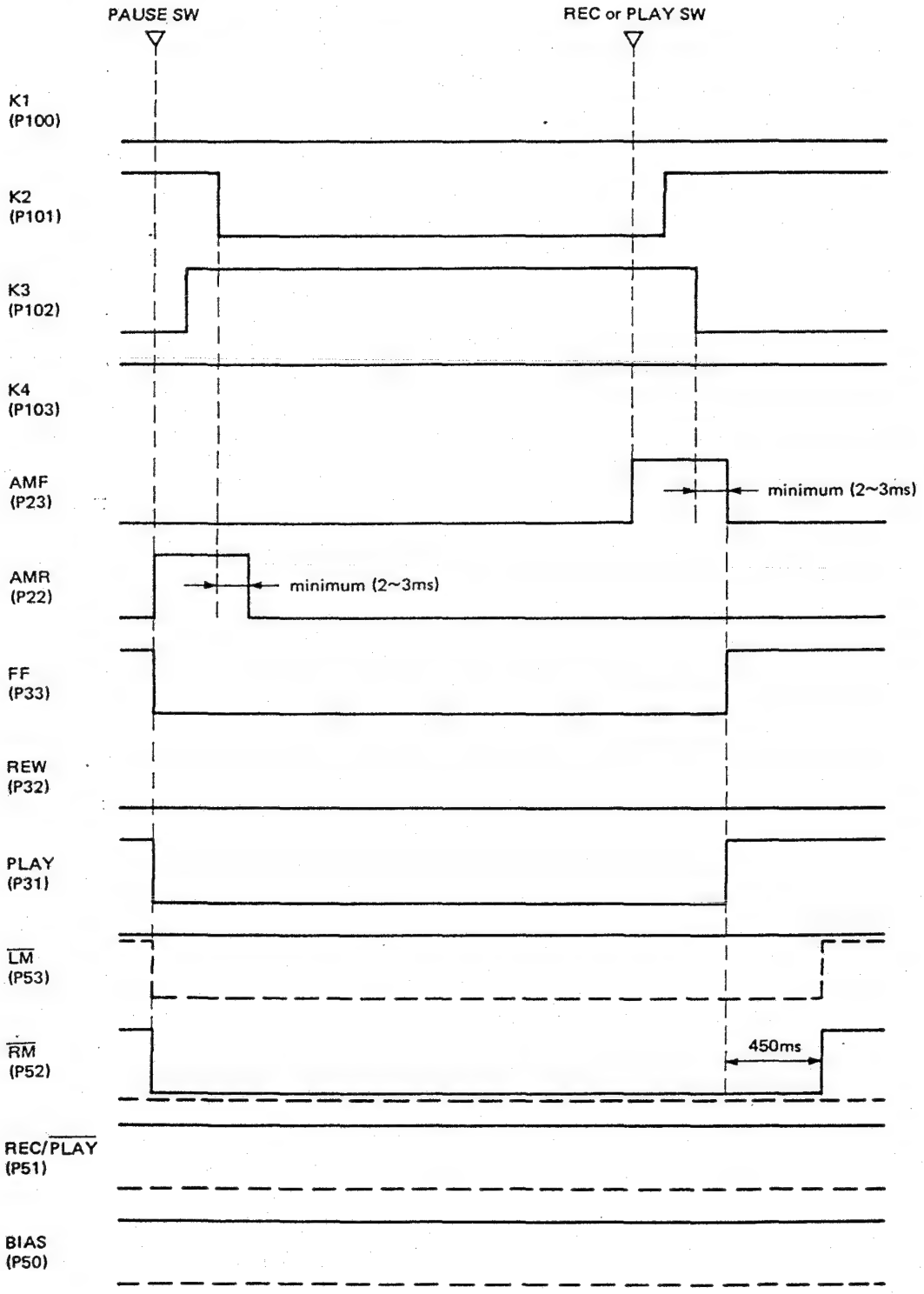
CIRCUIT DESCRIPTION

REV. REC → REV. REC PAUSE → REV. REC
REV. PLAY → REV. PLAY PAUSE → REV. PLAY (A BROKEN LINE)



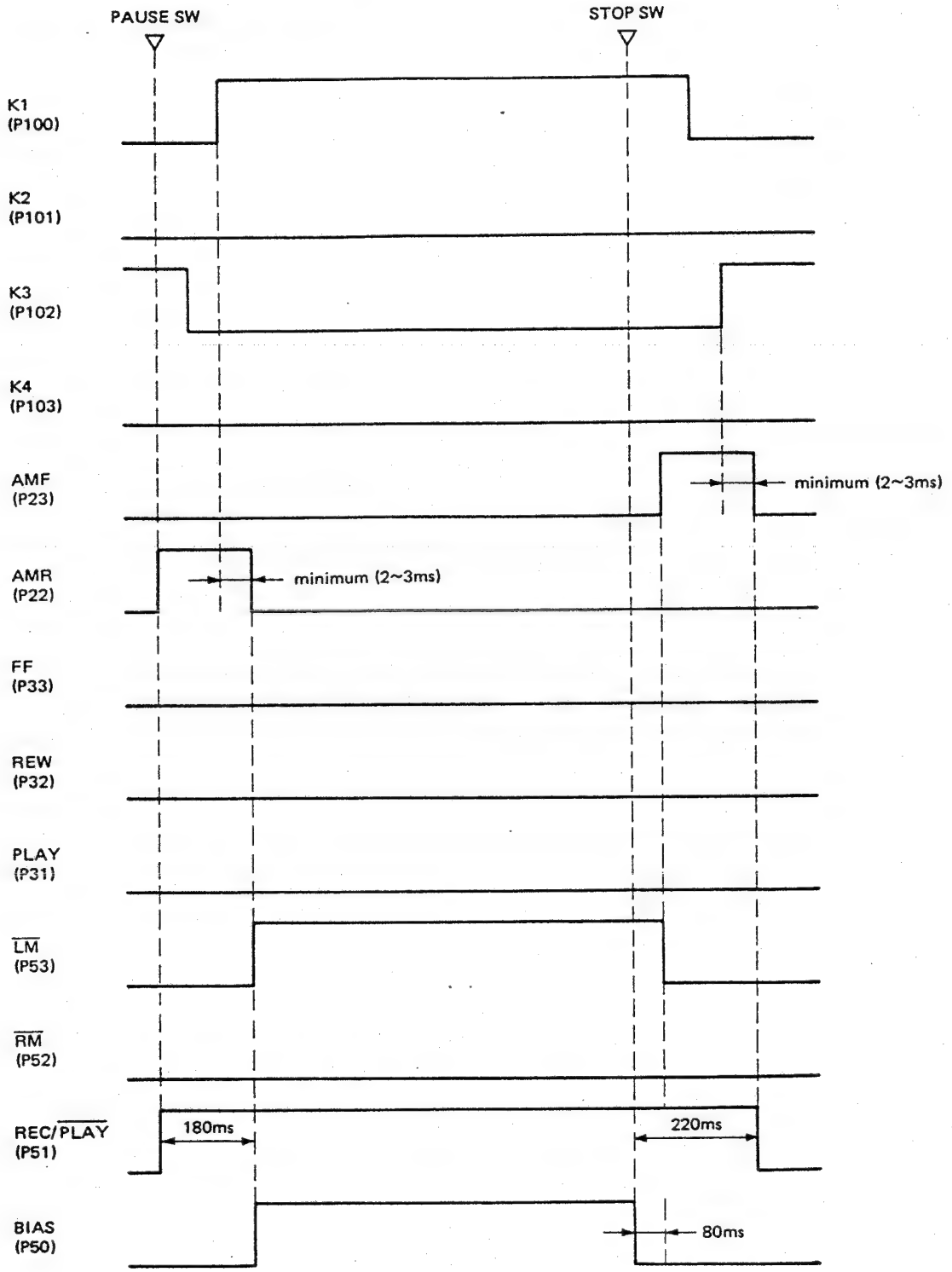
CIRCUIT DESCRIPTION

FWD. REC → FWD. REC PAUSE → FWD. REC
FWD. PLAY → FWD. PLAY PAUSE → FWD. PLAY (A BROKEN LINE)



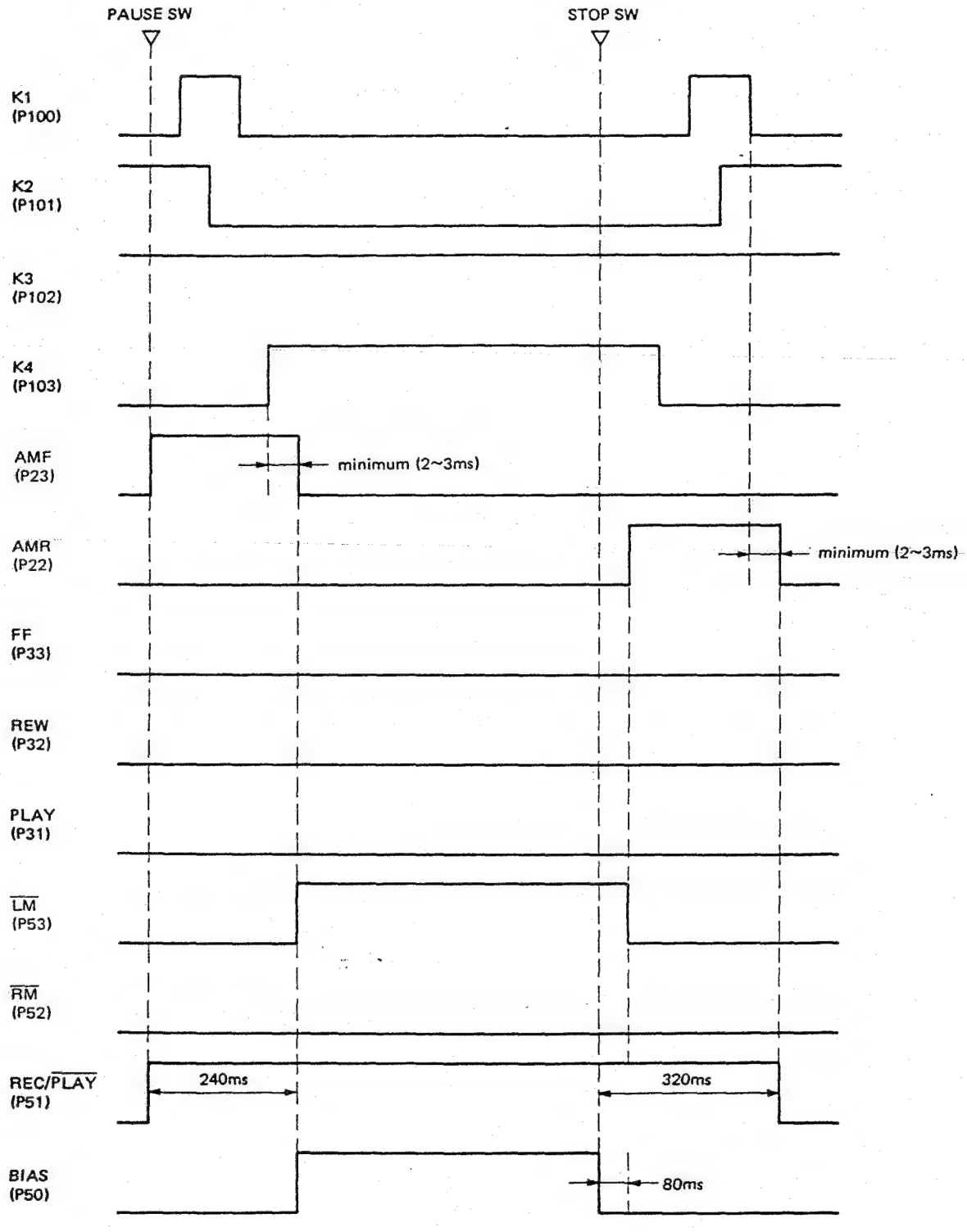
CIRCUIT DESCRIPTION

STOP → REV. REC PAUSE → STOP



CIRCUIT DESCRIPTION

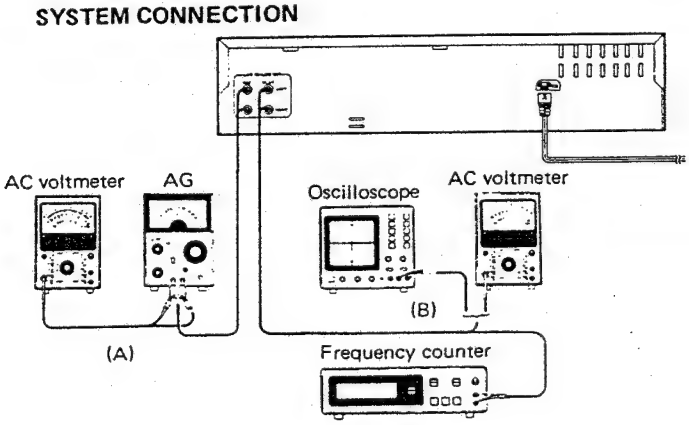
STOP→FWD. REC PAUSE→STOP



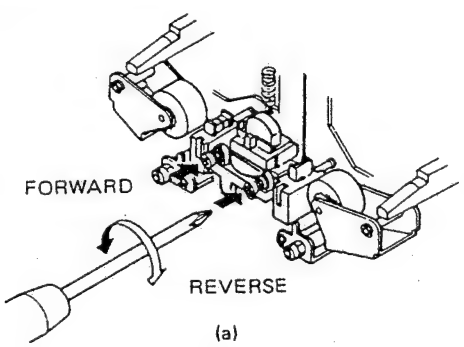
ADJUSTMENT

No.	ITEM	INPUT SETTINGS	OUTPUT SETTINGS	CASSETTE TAPE DECK SETTINGS	ALIGNMENT POINTS	ALIGN FOR	FIG.
CASSETTE DECK SECTION		TAPE: NORMAL, DOLBY: OFF, INPUT: LINE				0dBs=0.775V	
I REC/PLAY HEAD							
[1]	DEMAGNETIZATION	–	–	POWER: OFF Remove the cassette door.	REC/PLAY head	Demagnetize the REC/PLAY head with a head demagnetizer.	
[2]	CLEANING	–	–	PLAY	REC/PLAY head erase head, capstan, pinch roller.	Clean the REC/PLAY head erase head, capstan and pinch roller using a cotton swab slightly damped with alcohol.	
[3]	AZIMUTH	MTT-256 10kHz, -20dB	(B)	PLAY	Azimuth adjustment screw	Adjust the azimuth adjustment screw so that the output voltage is maximized in both forward and reverse direction.	(a)
DC MOTOR							
(i)	TAPE SPEED	MTT-111 MTT-111D	(B)	PLAY	Trimming potentiometer in the DC motor	Adjust the tape speed so that a 3kHz signal is produced at the center of the tape.	
II PC BOARD							
<1>	PLAYBACK LEVEL	MTT-256 315Hz, 0dB	(B)	PLAY	VR3 (L) VR4 (R) (X87-103)	Output level: -0.5dBs	
<2>	BIAS CURRENT	(A) 1kHz, -30dBs 10kHz, -30dBs	(B)	Adjust REC and BALANCE so that the REC monitor output becomes -26dBs at 1kHz, then record and reproduce signal of 1kHz and 10kHz in alternation.	VR5 (L) VR4 (R) (X26-108)	Record 1kHz and 10kHz in alternation and adjust the variable resistors which control the bias current so that the same playback level is obtained.	
<3>	RECORD LEVEL	(A) 1kHz, -30dBs	(B)	Record and reproduce a 1kHz signal under the conditions set in <2>.	VR1 (L) VR2 (R) (X87-103)	Adjust the variable resistors so that a playback level of -20dBs is obtained.	
<4>	FL PEAK LEVEL METER	(A) 1kHz, -10dBs	(B)	REC PAUSE Adjust REC and BALANCE so that the monitor output is -6dBs at 1kHz.	VR1 (X87-102)	0dB FL segment is completely lit.	

SYSTEM CONNECTION



AZIMUTH ADJUSTMENT SCREW

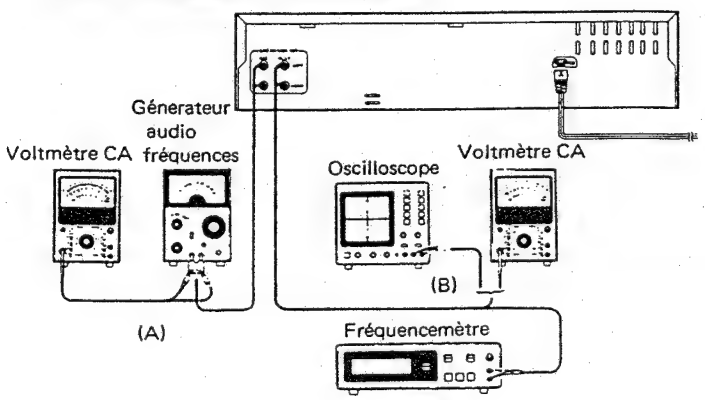


KX-990SR

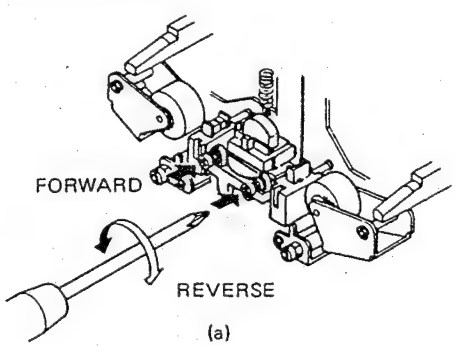
REGLAGE

N°	ITEM	REGLAGE DE L'ENTREE	REGLAGE DE LA SORTIE	REGLAGE DU MAGNETO -PHONE A CASSETTE	POINTS DE L'ALIGNEMENT	ALIGNER POUR	FIG.
SECTION DU MAGNETOPHONE		TAPE: NORMAL, DOLBY: OFF, ENTREE: LINE					0dBs=0,775V
I TETE D'ENREGISTREMENT/LECTURE							
[1]	DEMAGNETISATION	—	—	POWER: OFF Eloigner la porte.	Tête D'ENREGISTREMENT/ LECTURE	Demagnétiser la tête D'ENREGISTREMENT/LECTURE avec un démagnétiseur de tête.	
[2]	NETTOYAGE	—	—	PLAY	Tête D'ENREGISTREMENT/ LECTURE tête d'effacement, cabestan, galetpresseur.	Nettoyer la tête D'ENREGISTREMENT/LECTURE la tête d'effacement, le cabestan et le galetpresseur avec un coton-tige légèrement imbibé d'alcool.	
[3]	AZIMUT	MTT-256 10kHz. -20dB	(B)	PLAY	Vis d'azimut	Ajuster la vis de réglage de l'azimut de façon que la tension de sortie soit maximale à la fois en avant et en arrière, de la bande d'essai.	(a)
MOTEUR CC							
(i)	VITESSE DE DEFILEMENT	MTT-111 MTT-111D	(B)	PLAY	Résistance ajustable du moteur CC	Régler la vitesse de bande de façon qu'un signal de 3kHz soit produit au centre de la bande.	
II PLAQUE IMPRIMEE							
<1>	NIVEAU DE LECTURE	MTT-256 315Hz. 0dB	(B)	PLAY	VR3 (C) VR4 (D) (X87-103)	Niveau de sortie: -0,5dBs	
<2>	COURANT DE POLARISATION	(A) 1kHz. -30dBs 10kHz. -30dBs	(B)	Régler REC et BALANCE de façon que la sortie de moniteur REC soit de -26dBs à 1kHz, puis enregistrer et reproduire des signaux de 1kHz et 10kHz en alternance.	VR5 (C) VR4 (D) (X26-108)	Enregistrer un signal de 1kHz et 10kHz en alternance et ajuster les résistances variables qui commandent le courant de polarité de façon à obtenir le même niveau de lecture.	
<3>	NIVEAU D'ENREGISTREMENT	(A) 1kHz. -30dBs	(B)	Enregistrer et reproduire un signal de 1kHz dans les conditions précisées en <2>.	VR1 (C) VR2 (D) (X87-103)	Ajuster les résistances variables de façon à obtenir un niveau de lecture de -20dBs.	
<4>	INDICATEUR DE NIVEAU DE CRETE A FL	(A) 1kHz. -10dBs	(B)	REC PAUSE Ajuster REC et BALANCE de façon à ce que la sortie moniteur soit de -8dBs à 1kHz.	VR1 (X87-102)	Le segment de FL 0dB soit complétement allumé.	

RACCORDEMENTS DU SYSTEME



VIS D'AZIMUT

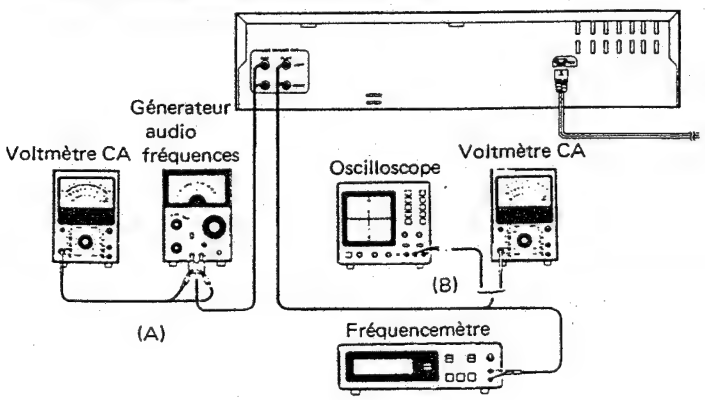


KX-990SR

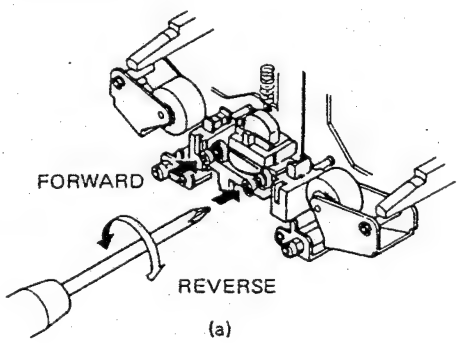
REGLAGE

N°	ITEM	REGLAGE DE L'ENTREE	REGLAGE DE LA SORTIE	REGLAGE DU MAGNETO -PHONE A CASSETTE	POINTS DE L'ALIGNEMENT	ALIGNER POUR	FIG.
SECTION DU MAGNETOPHONE		TAPE: NORMAL, DOLBY: OFF, ENTREE: LINE				0dBs=0,775V	
I TETE D'ENREGISTREMENT/LECTURE							
[1]	DEMAGNETISATION	—	—	POWER: OFF Eloigner la porte.	Tête D'ENREGISTREMENT/ LECTURE	Demagnétiser la tête D'ENREGISTREMENT/LECTURE avec un démagnétiseur de tête.	
[2]	NETTOYAGE	—	—	PLAY	Tête D'ENREGISTREMENT/ LECTURE tête d'effacement, cabestan, galetpresseur.	Nettoyer la tête D'ENREGISTREMENT/LECTURE la tête d'effacement, le cabestan et le galetpresseur avec un coton-tige légèrement imbibé d'alcool.	
[3]	AZIMUT	MTT-256 10kHz. -20dB	(B)	PLAY	Vis d'azimut	Ajuster la vis de réglage de l'azimut de façon que la tension de sortie soit maximale à la fois en avant et en arrière, de la bande d'essai.	(a)
MOTEUR CC							
(i)	VITESSE DE DEFILEMENT	MTT-111 MTT-111D	(B)	PLAY	Résistance ajustable du moteur CC	Régler la vitesse de bande de façon qu'un signal de 3kHz soit produit au centre de la bande.	
II PLAQUE IMPRIMEE							
<1>	NIVEAU DE LECTURE	MTT-256 315Hz. 0dB	(B)	PLAY	VR3 (C) VR4 (D) (X87-103)	Niveau de sortie: -0,5dBs	
<2>	COURANT DE POLARISATION	(A) 1kHz. -30dBs 10kHz. -30dBs	(B)	Régler REC et BALANCE de façon que la sortie de moniteur REC soit de -26dBs à 1kHz, puis enregistrer et reproduire des signaux de 1kHz et 10kHz en alternance.	VR5 (C) VR4 (D) (X26-108)	Enregistrer un signal de 1kHz et 10kHz en alternance et ajuster les résistances variables qui commandent le courant de polarité de façon à obtenir le même niveau de lecture.	
<3>	NIVEAU D'ENREGISTREMENT	(A) 1kHz. -30dBs	(B)	Enregistrer et reproduire un signal de 1kHz dans les conditions précisées en <2>.	VR1 (G) VR2 (D) (X87-103)	Ajuster les résistances variables de façon à obtenir un niveau de lecture de -20dBs.	
<4>	INDICATEUR DE NIVEAU DE CRETE A FL	(A) 1kHz. -10dBs	(B)	REC PAUSE Ajuster REC et BALANCE de façon à ce que la sortie moniteur soit de -6dBs à 1kHz.	VR1 (X87-102)	Le segment de FL 0dB soit complétement allumé.	

RACCORDEMENTS DU SYSTEME



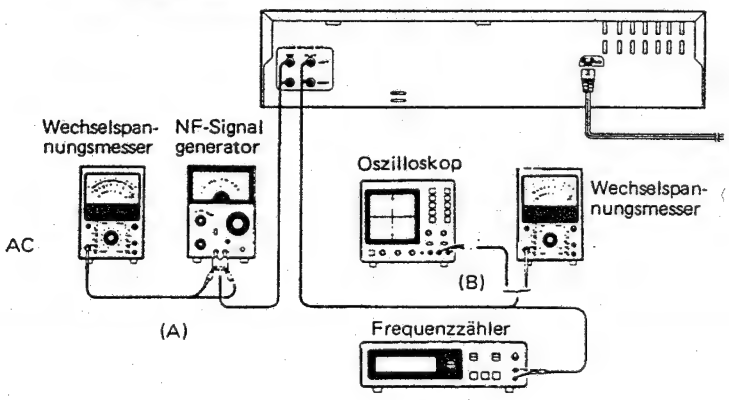
VIS D'AZIMUT



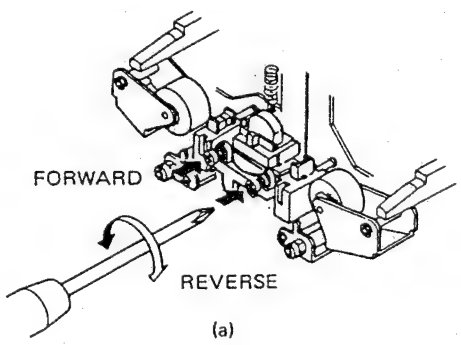
ABGLEICH

NR.	GEGENSTAND	EINGANGS-EINSTELLUNG	AUSGANGS-EINSTELLUNG	KASSETTENGERÄT-EINSTELLUNG	ABGLEICH PUNKTE	ABGLEICHEN FÜR	ABB.
CASSETTEN-DECK-ABTEILUNG		TAPE: NORMAL, DOLBY: OFF, EINGANG: LINE				0dBs=0,775V	
I AUFNAHME/WIEDERGABE-KOPF							
[1]	ENTMAGNETISIERUNG	—	—	POWER: OFF Den Kassettenfach deckel oben herausziehen.	AUFNAHME/ WIEDERGABE-Kopf	Entmagnetisierung von dem AUFNAHME/WIEDERGABE-Kopf mit einem Tonkopf Entmagnetisierungsdrossel.	
[2]	REINIGUNG	—	—	PLAY	AUFNAHME/ WIEDERGABE-Kopf Löschkopf, Tonwelle, Andruckrolle.	AUFNAHME/WIEDERGABE-Kopf, Löschkopf, Tonwelle und Andruckrolle mit einem leicht mit Alkohol befeuchteten Wattebausch reinigen.	
[3]	AZIMUT-EINSTELLUNG	MTT-256 10kHz, -20dB	(B)	PLAY	Azimut-Einstellschraube	Die Azimut-Justierschraube so einstellen, daß die maximale Ausgangsspannung in Vorwärts-Reverserichtung und erzielt.	(a)
GLEICHSTROMMOTOR							
(i)	BANDGESCHWINDIGKEIT	MTT-111 MTT-111D	(B)	PLAY	Trimmer potentiometer am Gleichstrommotor	Die Bandgeschwindigkeit so justieren, daß ein 3kHz Signal auf der Mitte des Bands erzeugt wird.	
II GEDRUCKTE SCHALTPLATTE							
<1>	WIEDERGABE-PEGEL	MTT-256 315Hz, 0dB	(B)	PLAY	VR3 (L) VR4 (R) (X87-103)	Ausgangspegel: -0,5dBs	
<2>	LEERLAUFSTROM	(A) 1kHz, -30dBs 10kHz, -30dBs	(B)	REC und BALANCE so justieren, daß der REC Monitorausgang -26dBs bei 1kHz wird, und danach abwechselnd Signale von 1kHz und 10kHz aufnehmen und wiedergeben.	VR5 (L) VR4 (R) (X26-108)	Signale von 1kHz und 10kHz abwechselnd aufnehmen und die Regelwiderstände, die den Vormagnetisierungsstrom regeln, so justieren, daß der gleiche Wiedergabepegel erzielt wird.	
<3>	AUFNAHMEPEGEL	(A) 1kHz, -30dBs	(B)	Ein 1kHz Signal unter den in Punkt <2> beschriebenen Bedingungen aufnehmen und reproduzieren.	VR1 (L) VR2 (R) (X87-103)	Die Regelwiderstände so justieren, daß ein wiedergabepegel von -20dBs erzielt wird.	
<4>	FL SPITZEN-PEGELMESSER	(A) 1kHz, -10dBs	(B)	REC PAUSE REC und BALANCE so einstellen, daß der Monitorausgang bei 1kHz, -6dBs ist.	VR1 (X87-102)	Der Regelwiderstand so justieren, daß das 0dB Segment vollständig leuchtet.	

SYSTEM-ANSCHLUSSE



AZIMUT-EINSTELLSCHRAUBE



X26-1080-11

	B	C	E
Q3~Q6	–	0V	–
Q7	8.2V	10V	7.6V
Q8	–8.2V	–10.3V	–7.6V
Q9	8.2V	10V	7.6V
Q10	–8.2V	–10.3V	–7.6V
Q11~Q14	–	0V	–
Q15	–	–	0V
Q16	–	–17.5V(NOR-CrO_2) 6.7V (MET)	–
Q17	–	–17.5V (NOR) 6.7V (CrO_2) –17.5V (MET)	–
Q20	REC, REC PAUSE : –1.25V (NOR) 1.15V (CrO_2) 7V (MET) OTHERS : 10.2V	10.1V	REC, REC PAUSE : –1.85V (NOR) 0.55V (CrO_2) 6.4V (MET) OTHERS : –10.3V
Q21	6.8V (NOR) –10V (CrO_2) –10V (CrO_2)	–	–10.3V
Q22~Q24	–	–	–10.3V
Q25,Q28	–	–	0V
Q29	4.6V (PLAY REC) 0V (OTHERS)	–	0V
Q30	5V (PLAY REC, REC PAUSE) 4V (OTHERS)	–17.5V (PLAY REC, REC PAUSE) 4.6V (OTHERS)	4.6V
Q31	–	–3V (REC) 4V (OTHERS)	–
Q32	–	0V (REC, REC PAUSE) 6.4V (OTHERS)	–
Q33	–	–	7.6V
Q34	–	–	0V
Q35	8.2V	10.1V	7.6V
Q36	–	–	0V
Q37	–	15.7V	0V
Q38	5.6V	–	5V
Q39	10.7V	–	10.1V
Q40	–	22V	10V
Q41	13.3V	22V	–
Q43	–10.9V	–	–10.3V
Q45	–19.1V	–40V	–18.5V
Q46	–5.7V	–19.1V	–5.1V
Q50	–	–	5V
	G	D	S
Q42	13.3V	13.3V	22V
Q44	–23.5V	–10.9V	–23.5V
Q47	–40V	–19.1V	–40V
Q48	8.2V	–8.2V	–10.3V
Q49	8.2V	10.0V	8.2V

IC1,2

1	0V
2	0V
3	0V
4	–9.8V
5	0V
6	0V
7	0V
8	9.6V

IC3

1	0V
2	–
3	0V
4	–10.3V
5	0V
6	–
7	0V
8	10V

IC4,5

1	0V
2	0V
3	0V
4	–10.3V
5	0V
6	0V
7	0V
8	10V

IC6

1	5V
6	5V
14	5V

IC7

1	0V
2	–
3	–
4	9.6V
5	–
6	–
7	12V
8	12V
9	–
10	–

IC8

1	0V
2	–
3	–
4	6.0V (FF REW) 5.4V (STOP PAUSE) 3.9V (PLAY REC)
5	–
6	–
7	12V
8	–
9	–
10	–

IC9

6	5V (PLAY REC, REC PAUSE) 4V (OTHERS)
9	4.8V (REC, REC PAUSE) –10.3V (OTHERS)
36	4.6V (PLAY REC) 0V (OTHERS)
37	–18.5V (FWD) 4.5V (REV)

X87-1030-00

IC1

6	–10V
8	0V
9	5.7V (NOR) 0V (CrO_2) –6.3V (MET)
11	10V

IC2

1	0V
2	–
3	–
4	–7.5V
5	7.5V
6	–
7	0V

X87-1020-00

IC1

1	–
2	–
3	0.7V
4	2V
5	0V
6	2V
7	0.7V
8	–
9	10V

IC2

1	0V
2	0V
3	0V
4	–10.3V
5	0V
6	0V
8	10V
9	0V

X30-1140-00

IC1

2	7.6V
9	–5.5V
10	–6.8V
14	0V
17	–7.2V
18	–2.2V
20	–7.2V
21	–7.1V
27	–7.6V

IC2

2	–7.6V
8	–7.1V
9	–7.2V
11	–2.2V
12	–7.2V
19	–6.8V
20	–5.5V
27	7.6V

X25-2250-00

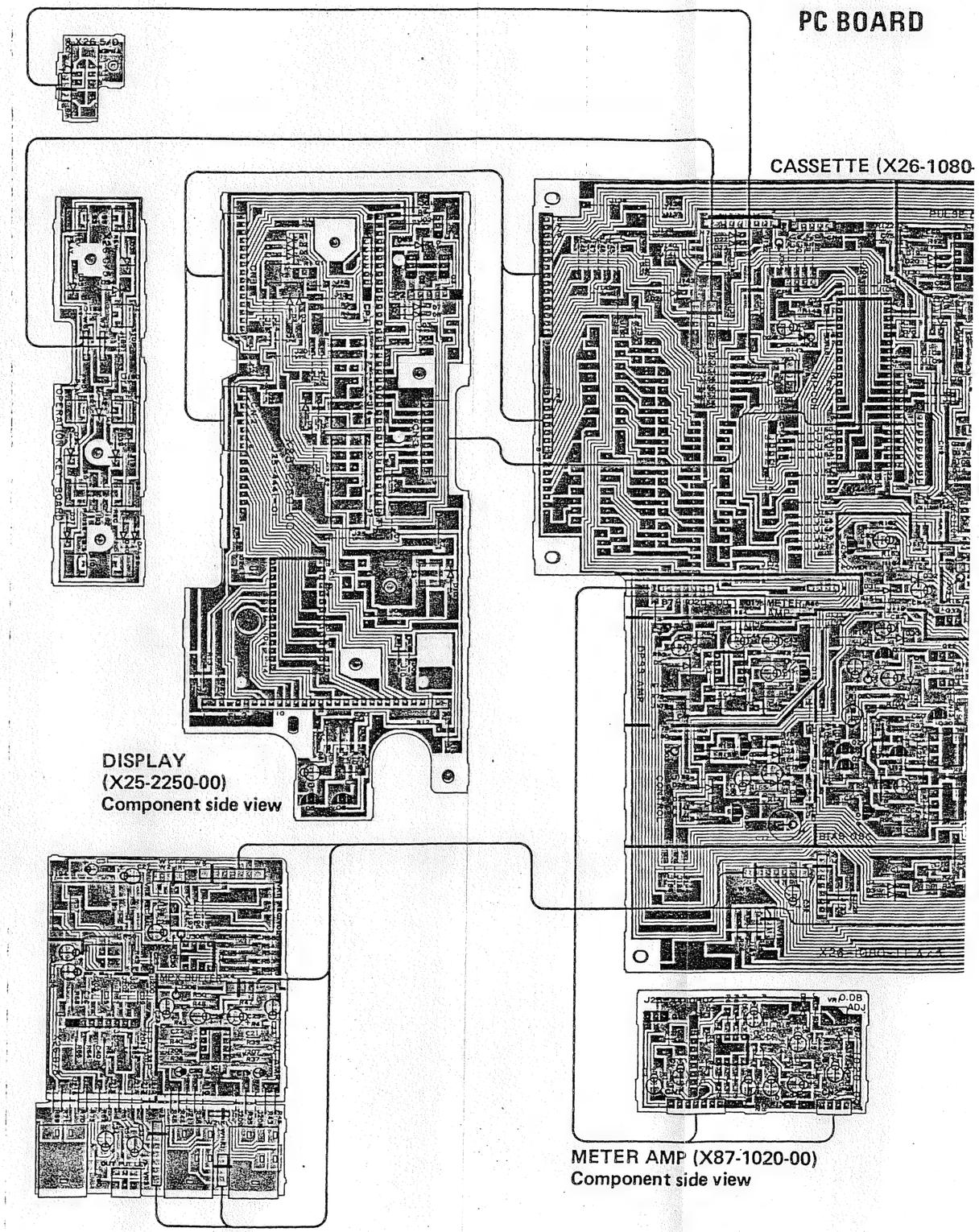
IC1

1	18.5V
2	–
3	0V
22	NC
23	NC
24	–
25	–3.2V
26	–15.7V
27	–17.5V
28	–17.5V

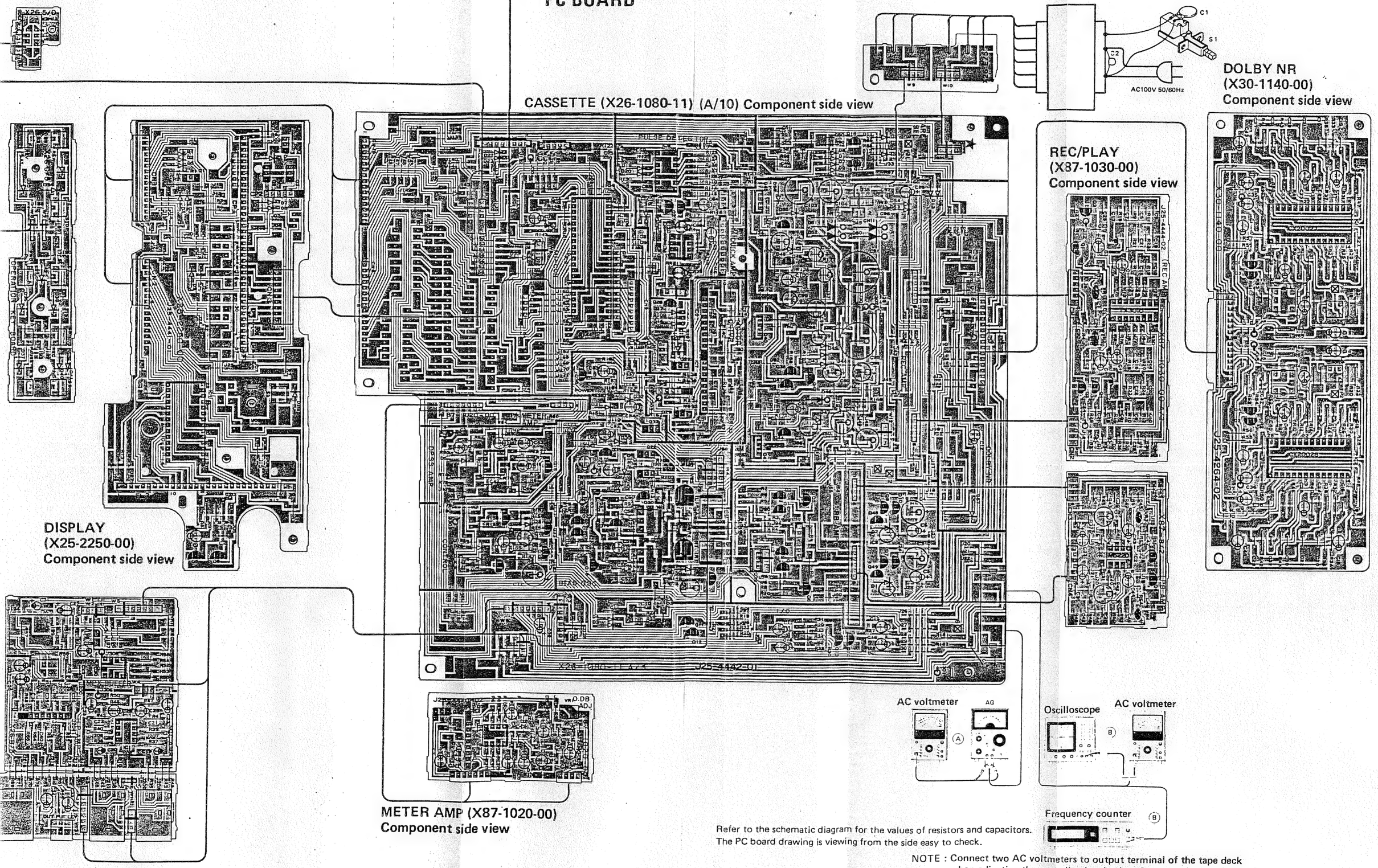
X25-2250-00

	B	C	E
Q1	5V (DOLBY B)	–	–
Q4	–18.5V (FWD)	–	–18.5V
Q5	–	–	–18.5V
Q6	–	–	–18.5V

PC BOARD

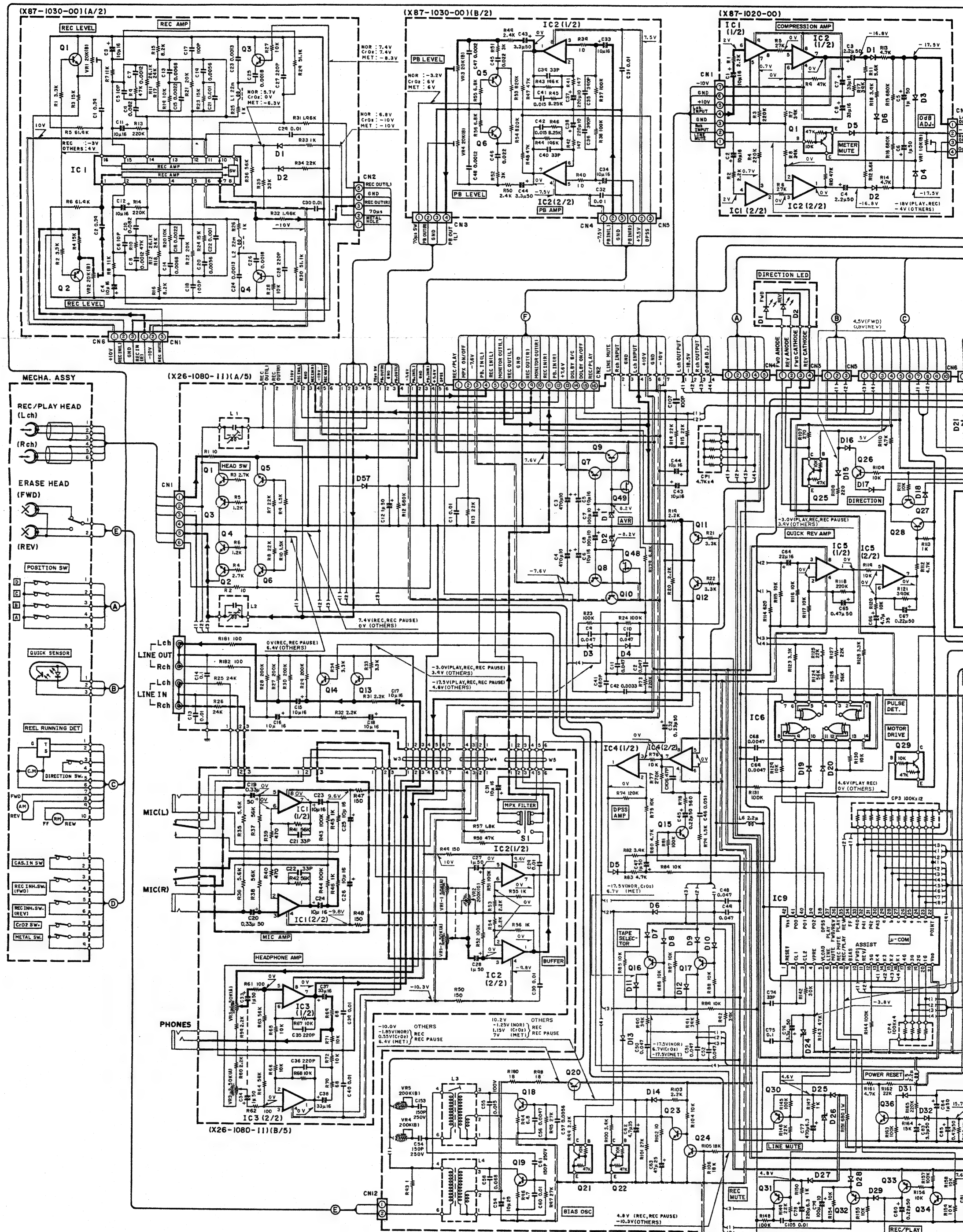


PC BOARD

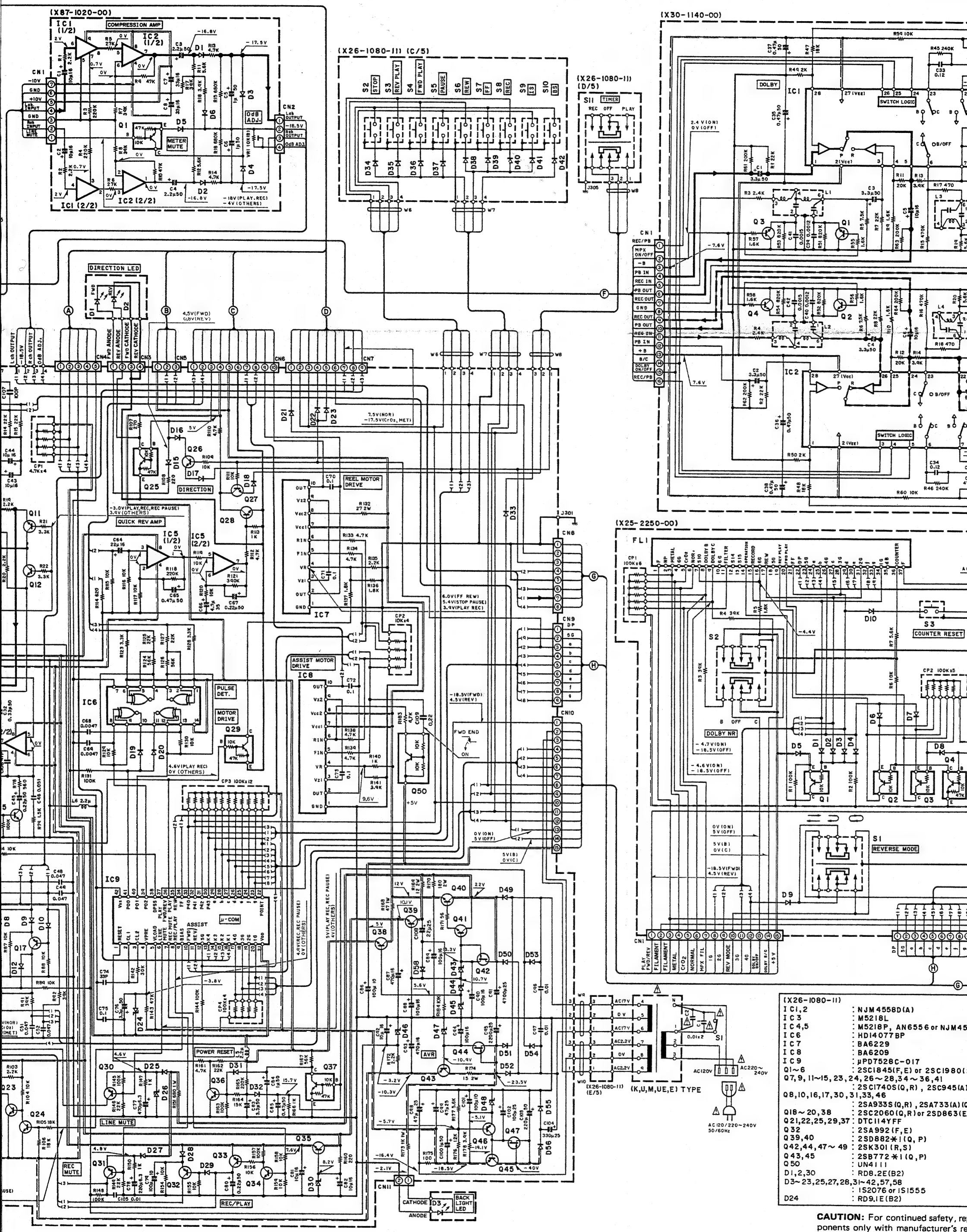


Refer to the schematic diagram for the values of resistors and capacitors.
The PC board drawing is viewing from the side easy to check.

NOTE : Connect two AC voltmeters to output terminal of the tape deck when adjusting the recording head azimuth.



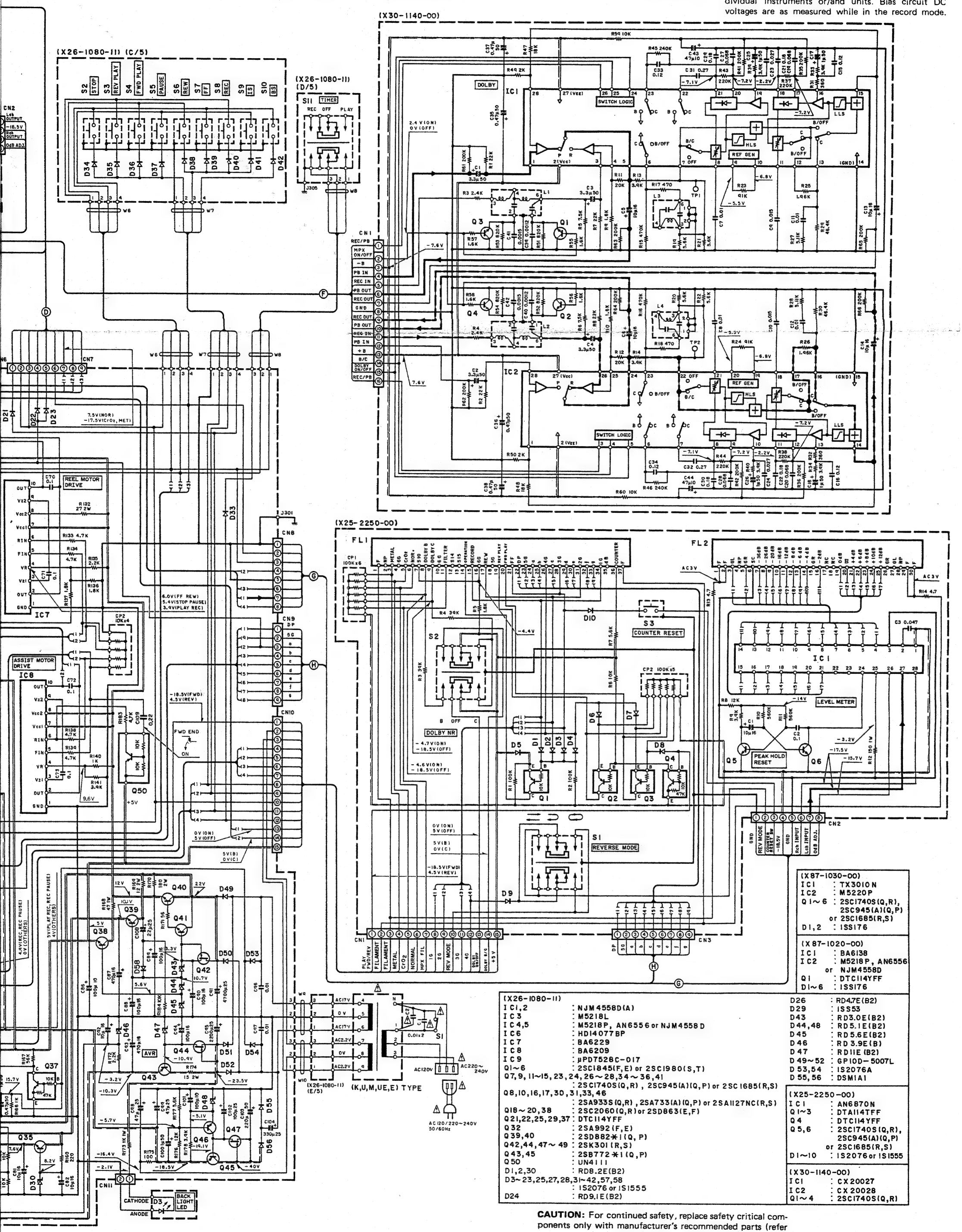
NOTE : Make sure to turn the power off before disconnecting the wires from the cassette mechanism when removing the mechanism for repair.
If not, the mechanism will lock itself up and cannot be reset.



(X26-1080-11)	
IC1,2	: NJM4558D(A)
IC3	: M5218L
IC4,5	: M5218P, AN6556 or NJM45
IC6	: HD14077BP
IC7	: BA6229
IC8	: BA6209
IC9	: μPD7528C-017
Q1~6	: 2SC1845(F,E) or 2SC1980(
Q7,9,11~15,23,24,26~28,34~36,41	: 2SC1740S(Q,R), 2SC945(A)
Q8,10,16,17,30,31,33,46	: 2SA933S(Q,R), 2SA733(A)(Q
Q18~20,38	: 2SC2060(Q,R) or 2SD863(E
Q21,22,25,29,37	: DTC114YFF
Q32	: 2SA992(F,E)
Q39,40	: 2SD882*1(Q,P)
Q42,44,47~49	: 2SK301(R,S)
Q43,45	: 2SB772*1(Q,P)
Q50	: UN4111
D1,2,30	: RD8.2E(B2)
D3~23,25,27,28,31~42,57,58	: 1S2076 or 1S1555
D24	: RD9.1E(B2)

CAUTION: For continued safety, re
ponents only with manufacturer's re
to parts list). ⚠Indicates safety c
reduce the risk of electric shock, leak
measurements shall be carried out (ex
bly insulated from the supply circuit
returned to the customer.

- DC voltages are as measured with a high impedance voltmeter with a cassette loaded at playback mode. Values may vary slightly due to variations between individual instruments or/and units. Bias circuit DC voltages are as measured while in the record mode.



(X26-1080-11)	
IC1,2	: NJM4558D(A)
IC3	: M5218L
IC4,5	: M5218P, AN6556 or NJM4558D
IC6	: HD14077BP
IC7	: BA6229
IC8	: BA6209
IC9	: μPD7528C-017
Q1~6	: 2SC1845(F,E) or 2SC1980(S,T)
Q7,9,11~15,23,24,26~28,34~36,41	: 2SC1740S(Q,R), 2SC945(A)(Q,P) or 2SC1685(R,S)
Q8,10,16,17,30,31,33,46	: 2SA933S(Q,R), 2SA733(A)(Q,P) or 2SA1127NC(R,S)
Q18~20,38	: 2SC2060(Q,R) or 2SD863(E,F)
Q21,22,25,29,37	: DTC114YFF
Q32	: 2SA992(F,E)
Q39,40	: 2SD882*1(Q,P)
Q42,44,47~49	: 2SK301(R,S)
Q43,45	: 2SB772*1(Q,P)
Q50	: UN4111
D1,2,30	: RD8.2E(B2)
D3~23,25,27,28,31~42,57,58	: 1S2076 or 1S1555
D24	: RD9.1E(B2)
D26	: RD4.7E(B2)
D29	: 1SS53
D43	: RD3.0E(B2)
D44,48	: RD5.1E(B2)
D45	: RD5.6E(B2)
D46	: RD3.9E(B)
D47	: RD11E(B2)
D49~52	: GP10D-5007L
D53,54	: 1S2076A
D55,56	: DSM1A1

(X87-1030-00)	
IC1	: TX3010N
IC2	: M5220P
Q1~6	: 2SC1740S(Q,R), 2SC945(A)(Q,P) or 2SC1685(R,S)
D1,2	: 1SS176

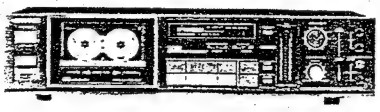
(X87-1020-00)	
IC1	: BA6138
IC2	: M5218P, AN6556 or NJM4558D
Q1	: DTC114YFF
D1~6	: 1SS176

(X25-2250-00)	
IC1	: AN6870N
Q1~3	: DTA114TFF
Q4	: DTC114YFF
Q5,6	: 2SC1740S(Q,R), 2SC945(A)(Q,P) or 2SC1685(R,S)
D1~10	: 1S2076 or 1S1555

(X30-1140-00)	
IC1	: CX20027
IC2	: CX20028
Q1~4	: 2SC1740S(Q,R)

CAUTION: For continued safety, replace safety critical components only with manufacturer's recommended parts (refer to parts list). ⚠Indicates safety critical components. To reduce the risk of electric shock, leakage-current or resistance measurements shall be carried out (exposed parts are acceptably insulated from the supply circuit) before the appliance is returned to the customer.

KX-990SR



Input Sensitivity/Impedance:		
LINE x 2	77.5mV/50 k onms	
Microphones x 2	0.3 mV/600 ohms	
Output Level/Load Impedance:		
LINE x 2	0.77V (0 VU)/50 k ohms	
Headphones x 1	0.85 mW/8 ohms	
Power Requirements	AC 120/220 ~ 240V (Switchable), 50/60 Hz	
Power Consumption	31 watts	
Dimensions	W: 440 mm (17-5/16")	
	H: 111 mm (4-3/8")	
	D: 322 mm (12-11/16")	
Weight	6.2 kg (13.7 lb)	
Supplied Accessories	Audio Connection Cables x 2	
Reference Tapes	Normal:	KENWOOD ND-60 or TDK AD C-60
	CrO_2:	KENWOOD CD-60 or TDK SA C-60
	Metal:	KENWOOD MD-60 or TDK MA C-60

We follow a policy of continuous development.
For this reason specifications may be changed without notice.

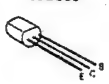
STEREO CASSETTE TAPE DECK

SPECIFICATIONS

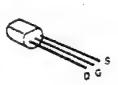
Type	Front Loading Auto-Reverse Stereo Cassette Deck with Dolby B,C NR System
Track System	4-Track, 2-Channel Stereo/Mono Recording/Playback/Auto-Reverse in Record & Playback
Recording System	AC Bias System (Bias Frequency: 105 kHz)
Erasing System	AC System
Tape Speed	4.76 cm/sec (1-7/8 ips)
Heads	4-Track/2-Channel Amorphous Alloy Record Head/Playback Head Ease Head x 1 (Double Gap Ferrite with Sendust-Guard)
Motors	Electronically-Controlled DC Motor (For Capstan Drive) Reel Drive: DC Motor Mechanism Drive: DC Motor
Fast Winding Time	Approx. 80 seconds with C-60 tape
Frequency Response:	
Normal Tape	20 Hz to 17,000 Hz ± 3 dB
CrO_2 Tape	20 Hz to 17,000 Hz ± 3 dB
Metal Tape	20 Hz to 19,000 Hz ± 3 dB
Signal to Noise Ratio:	
Dolby C Type NR ON	74 dB (Metal Tape)
Dolby B Type NR ON	67 dB (Metal Tape)
Dolby NR OFF	57 dB (Metal Tape)
Harmonic Distortion	Less than 0.8% (at 1 kHz, 0 VU with Metal Tape)
Wow and Flutter	0.035% (W.R.M.S.) ± 0.09% (DIN)

KENWOOD

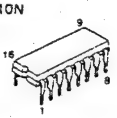
2SA1127NC
2SA733
2SA992
2SC1685
2SC1845
2SC1980
2SC2060
2SC2320
2SC945
2SD863



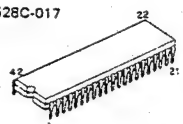
2SK301



TX3010N



μPD7528C-017

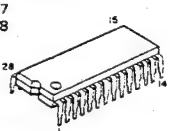


2S8772*1
2SD882*1

NJM4558D

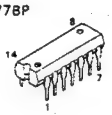
BA6138

CX20027
CX20028

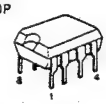


DTA114TFF
DTC114YFF

HD140778P

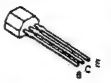


AN6556
M5218P
M5220P

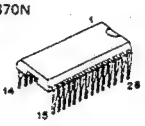


BA6209
BA6229

2SA933S
2SC1740S



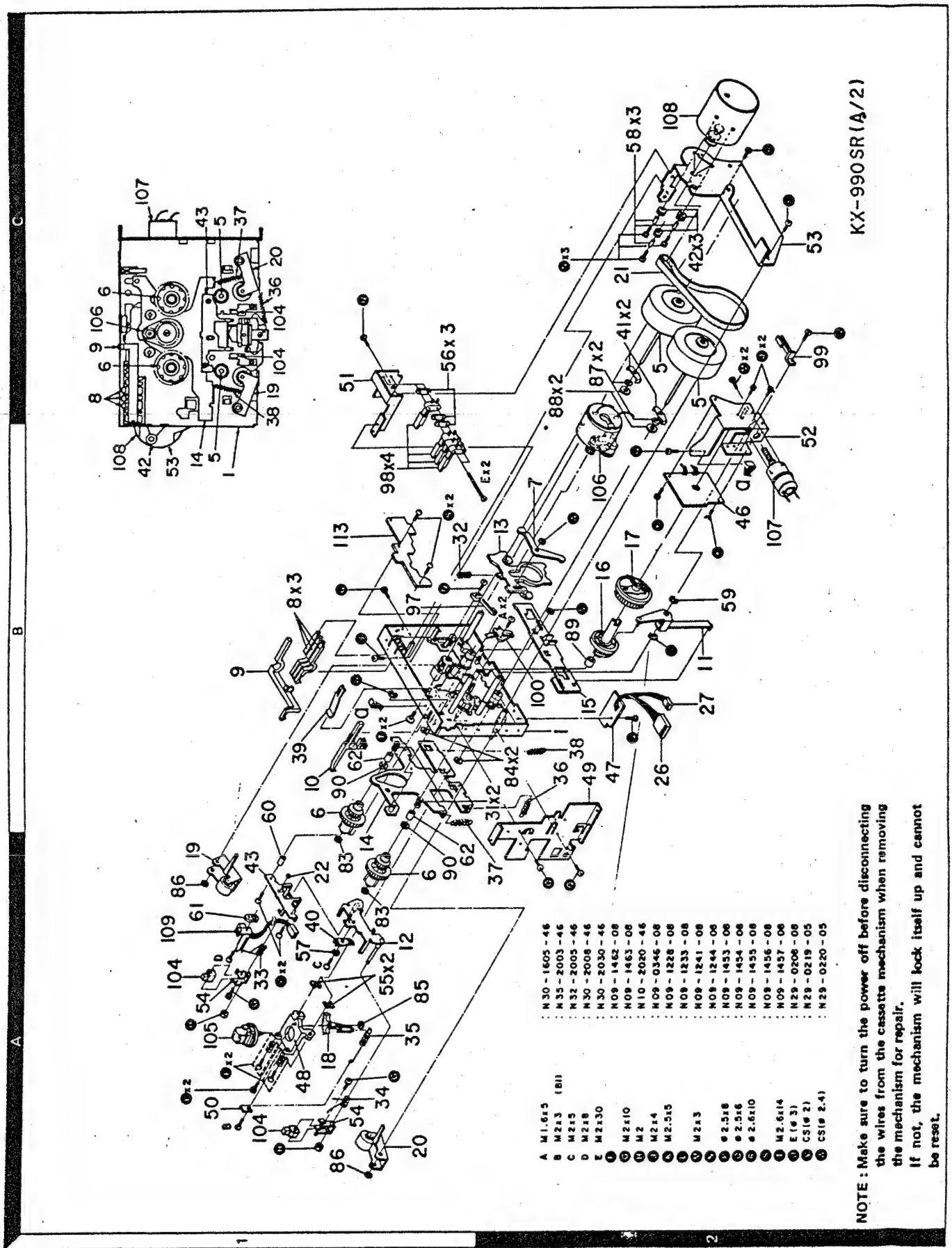
AN6870N



M5218L

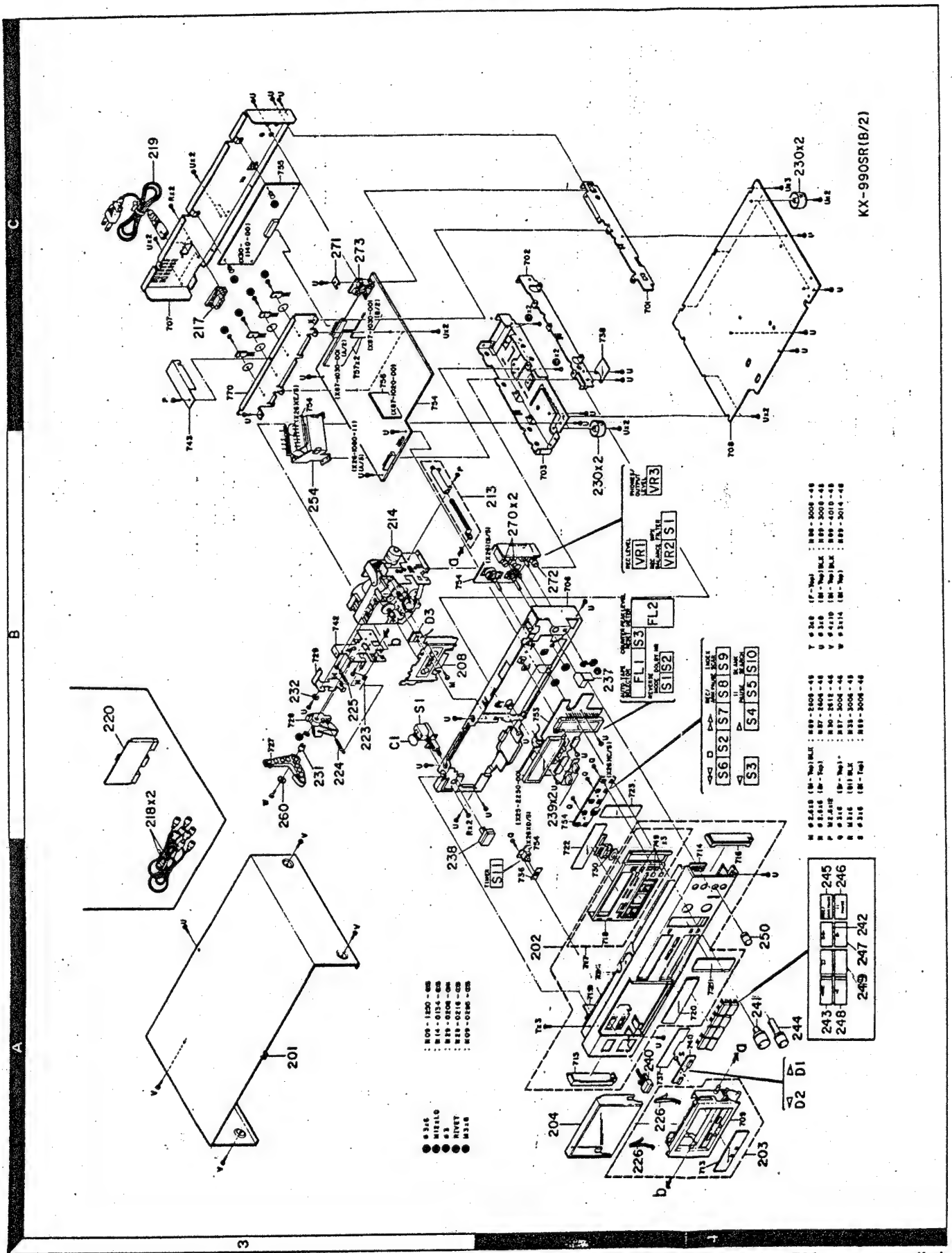
UN4111

EXPLODED VIEW (MECHANISM)



Parts with the exploded numbers larger than 700 are not supplied.

EXPLODED VIEW



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				KX-990SR			
	201	3A		A01-0669-12	METALLIC CABINET		
	202	4A	*	A20-4139-03	PANEL ASSY		
	203	4A	*	A53-0641-03	CASSETTE HOLDER ASSY		
	204	4A	*	A53-0643-13	CASSETTE LID		
	208	3B	*	B03-1557-04	DRESSING PLATE(FRONT OF C MECH		
	-			B46-0092-03	WARRANTY CARD	K	
	-			B46-0094-03	WARRANTY CARD	UUE	
	-			B46-0095-03	WARRANTY CARD	UUE	
	-			B46-0122-03	WARRANTY CARD	E	
	-		*	B50-5417-00	INSTRUCTION MANUAL(ENGLISH)		
	-		*	B50-5418-00	INSTRUCTION MANUAL(FRENCH)	ME	
	-		*	B50-5419-00	INSTRUCTION MANUAL(SPANISH)	M	
	-		*	B50-5437-00	INSTRUCTION MANUAL(G,D,I)	E	
	-			B58-0223-04	CAUTION CARD(PRESET-120V)	U	
	-			B58-0269-04	CAUTION CARD	K	
	-			B58-0513-04	CAUTION CARD(PRESET-240)	UE	
	-			B59-0092-00	SERVICE DIRECTORY	UUE	
	-			B59-0094-00	SUB-INSTRUCTION MANUAL(ENGLISH		
	-			B59-0095-00	SUB-INSTRUCTION MANUAL(FRENCH)	ME	
	-			B59-0096-00	SUB-INSTRUCTION MANUAL(SPANISH	M	
	-			B59-0097-00	SUB-INSTRUCTION MANUAL(G,D,I)	E	
	-			B59-0112-00	SUB-INSTRUCTION MANUAL(ARABIC)	M	
	D1 ,2	4A		B30-0499-05	LED(LN0202RP2)TRAVEL DISPLAY		
	D3	3B		B30-0740-05	LED(SLF-201C) C.HALF WINDOW		
⚠	C1	3B		C91-0023-05	CERAMIC 0.01UF AC250V	UMUE	
⚠	C1	3B		C91-0647-05	CERAMIC 0.01UF P	KE	
	213	4B		D39-0168-05	DAMPER ASSY		
	214	3B	*	D40-0320-05	CASSETTE MECHANISM ASSY		
⚠	217	3C		E03-0102-15	AC INLET		
	218	3B		E30-0505-05	AUDIO CORD		
⚠	219	3C		E30-0687-05	AC POWER CORD (INLET)	K	
⚠	219	3C		E30-1305-15	AC POWER CORD (INLET)	UMUE	
⚠	219	3C		E30-1329-05	AC POWER CORD (INLET)	E	
	220	3B		F09-0052-14	HEAD PROTECTOR		
	223	3B		G01-1226-14	TORSION COIL SP(C HOLDER)LEFT		
	224	3B		G01-1228-04	EXTENSION SPRING(LEVER-B)		
	225	3B	*	G01-1556-04	EXTENSION SPRING(LEVER-C)		
	226	4A		G02-0123-04	FLAT SPRING(C HOLDER)		
	-		*	H01-5260-04	ITEM CARTON CASE		
	-		*	H10-1759-02	POLYSTYRENE FOAMED FIXTURE		
	-		*	H10-1760-02	POLYSTYRENE FOAMED FIXTURE		
	-			H20-0417-04	PROTECTION COVER(460X370X360)	M	
	-			H25-0078-04	PROTECTION BAG (235X315)		
	-			H25-0224-04	PROTECTION BAG (800X400)	KUUEE	
	-			H40-0005-04	RUST PREVENTING PAPER(380X250)	M	
	230	4B,4C		J02-0127-05	FOOT		
	231	3B		J31-0176-04	COLLAR(LEVER-A)		
	232	3B	*	J31-0244-04	COLLAR(LEVER-C)		
	-			J61-0307-05	WIRE BAND		
	237	4B		K27-1081-04	KNOB (BUTTON) MPX FILTER		

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	238	3A		K27-1082-04	KNOB (BUTTON) POWER		
	239	4B	*	K27-1350-04	KNOB (LEVER) REV MODE,DOLBY		
	240	4A		K29-1868-03	KNOB (BUTTON) EJECT		
	241	4A		K29-1822-04	KNOB REC LEVEL		
	242	4A		K29-1865-04	KNOB (BUTTON) FF		
	243	4A		K29-1866-04	KNOB (BUTTON) REW		
	244	4A		K29-1867-04	KNOB REC BALANCE		
	245	4A	*	K29-1890-04	KNOB (BUTTON) REC/ARM PAUSE		
	246	4A	*	K29-1891-04	KNOB (BUTTON) PAUSE		
	247	4A	*	K29-1892-04	KNOB (BUTTON) FWD		
	248	4A	*	K29-1893-04	KNOB (BUTTON) REV		
	249	4A	*	K29-1894-04	KNOB (BUTTON) STOP		
	250	4A	*	K29-1964-04	KNOB PHONES/OUTPUT LEVEL		
⚠	254	3B	*	L01-3794-05	POWER TRANSFORMER		
	260	3B		N19-0824-05	FLAT WASHER (ø3.2)		
	A			N09-1250-05	TAPTITE SCREW (ø3X6)		
	B			N14-0134-05	HEXAGON NUT (M12X1.0)		
	C			N29-0208-04	RETAINING RING (ø3)		
	D			N29-0216-05	RIVET(X30-1140-00)		
⚠	S1	3B		S40-1066-05	PUSH SWITCH (POWER TYPE)		
	DISPLAY (X25-2250-00)						
	C1			CE04FW1C100M	ELECTRO 10UF 16WV		
	C2			CF92FV1H104J	MF 0.10UF J		
	C3			CF92FV1H473J	MF 0.047UF J		
	CP1		*	R90-0426-05	MULTI-COMP 100KX6 J 1/6W		
	CP2			R90-0203-05	MULTI-COMP 100KX5 J 1/6W		
	R12			RS14KB3A151J	FL-PROOF RS 150 J 1W		
	S1 ,2	4B		S31-2313-05	SLIDE SWITCH(REV MODE,DOLBY NR		
	S3	4B		S40-1065-05	PUSH SWITCH (COUNTER RESET)		
	D1 -10			1S1555	DIODE		
	D1 -10			1S2076	DIODE		
	FL1	4B	*	6-BT-33ZK	FLUORESCENT INDICATOR TUBE		
	FL2	4B	*	BG-251ZK	FLUORESCENT INDICATOR TUBE		
	IC1			AN6870N	IC(LEVEL METER DRIVER)		
	Q1 -3		*	DTA114TFF	DIGITAL TRANSISTOR		
	Q4			DTC114YFF	DIGITAL TRANSISTOR		
	Q5 ,6			2SC1685(R,S)	TRANSISTOR		
	Q5 ,6			2SC1740S(Q,R)	TRANSISTOR		
	Q5 ,6			2SC945(A)(Q,P)	TRANSISTOR		
	CASSETTE (X26-1080-11)						
	C1			CK45FF1H103Z	CERAMIC 0.010UF Z		
	C2			CK45FF1H473Z	CERAMIC 0.047UF Z		
	C3 ,4			CE04FW1A471MEL	ELECTRO 470UF 10WV		
	C5 ,6			CE04FW1C100MEL	ELECTRO 10UF 16WV		
	C7 ,8			CE04FW1A101MEL	ELECTRO 100UF 10WV		
	C9 -11			CK45FF1H473Z	CERAMIC 0.047UF Z		
	C12			CE04FW1H010MEL	ELECTRO 1.0UF 50WV		
	C13			CK45FF1H103Z	CERAMIC 0.010UF Z		
	C14			C91-0699-05	CERAMIC 0.1UF K		
	C15 -18			CE04FW1C100MEL	ELECTRO 10UF 16WV		
	C19 ,20		*	CE04JW1HR33M	ELECTRO 0.33UF 50WV		
	C21 ,22			CC45FSL1H330J	CERAMIC 33PF J		

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C23 -26			CE04FW1C100MEL	ELECTRO	10UF	16WV		
C27 ,28			CE04W1H010MEL	ELECTRO	1.0UF	50WV		
C29 ,30			CK45FF1H103Z	CERAMIC	0.010UF	Z		
C31			CE04JW1C100M	ELECTRO	10UF	16WV		
C32			CE04FW1HR33MEL	ELECTRO	0.33UF	50WV		
C33 ,34			CE04FW1H010MEL	ELECTRO	1.0UF	50WV		
C35 ,36			CC45FSL1H221J	CERAMIC	220PF	J		
C37 ,38			CE04W1C330MEL	ELECTRO	33UF	16WV		
C39 ,40			CK45FF1H103Z	CERAMIC	0.010UF	Z		
C41			CK45FB1H681K	CERAMIC	680PF	K		
C42			CF92FV1H332J	MF	3300PF	J		
C43 ,44			CE04FW1C100MEL	ELECTRO	10UF	16WV		
C45			CE04FW1HR22MEL	ELECTRO	0.22UF	50WV		
C46			CF92FV1H513J	MF	0.051UF	J		
C47			CE04FW1H010MEL	ELECTRO	1.0UF	50WV		
C48 -52			CK45FF1H473Z	CERAMIC	0.047UF	Z		
C53 ,54			C91-0357-05	POLYSTY	150PF	J		
C55		*	CQ93HP2A153J	MYLAR	0.015UF	J		
C56			CF92FV1H472J	MF	4700PF	J		
C57			CF92FV1H562J	MF	5600PF	J		
C58			CF92FV1H683J	MF	0.068UF	J		
C59			CE04FW1E100MEL	ELECTRO	10UF	25WV		
C60			CF92FV1H103J	MF	0.010UF	J		
C61			C91-0357-05	POLYSTY	150PF	J		
C62			CE04FW1V4R7MEL	ELECTRO	4.7UF	35WV		
C63			CE04FW1E470MEL	ELECTRO	47UF	25WV		
C64			CE04FW1C220MEL	ELECTRO	22UF	16WV		
C65			CE04FW1HR47MEL	ELECTRO	0.47UF	50WV		
C66			CE04FW1V4R7MEL	ELECTRO	4.7UF	35WV		
C67			CE04FW1HR22MEL	ELECTRO	0.22UF	50WV		
C68 ,69			CF92FV1H472J	MF	4700PF	J		
C70 -73			C91-0700-05	CERAMIC	0.1UF	J		
C74			CC45FSL1H330J	CERAMIC	33PF	J		
C75			C91-0700-05	CERAMIC	0.1UF	J		
C76			CE04FW1H3R3MEL	ELECTRO	3.3UF	50WV		
C77		*	CE04FW0J471MEL	ELECTRO	470UF	6.3WV		
C78			CE04FW0J221MEL	ELECTRO	220UF	6.3WV		
C79			CE04FW1A101MEL	ELECTRO	100UF	10WV		
C80			CE04FW1HR22MEL	ELECTRO	0.22UF	50WV		
C81 ,82			CE04FW1C100MEL	ELECTRO	10UF	16WV		
C83			CE04FW1H3R3MEL	ELECTRO	3.3UF	50WV		
C84			CE04FW1H010MEL	ELECTRO	1.0UF	50WV		
C85			CE04FW1HR47MEL	ELECTRO	0.47UF	50WV		
C86			CE04FW1A101MEL	ELECTRO	100UF	10WV		
C87			CE04FW1C471MEL	ELECTRO	470UF	16WV		
C88 -90			CE04FW1C101MEL	ELECTRO	100UF	16WV		
C91			C90-1284-05	ELECTRO	4700UF	25WV		
C92			CE04FW1C100MEL	ELECTRO	10UF	16WV		
C93			CE04FW1C471MEL	ELECTRO	470UF	16WV		
C94			CE04FW1C101MEL	ELECTRO	100UF	16WV		
C95			CE04FW1E222MEL	ELECTRO	2200UF	25WV		
C96 ,97			CK45FF1H103Z	CERAMIC	0.010UF	Z		
C98 ,99			CE04FW1E470MEL	ELECTRO	47UF	25WV		
C100			CE04FW1H010MEL	ELECTRO	1.0UF	50WV		
C101			CE04FW1A101MEL	ELECTRO	100UF	10WV		

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C102			CE04FW1E101MEL	ELECTRO 100UF 25WV		
C103			CE04W1H221MEL	ELECTRO 220UF 50WV		
C104			CE04FW1E331MEL	ELECTRO 330UF 25WV		
C105			CK45FF1H103Z	CERAMIC 0.01UF Z		
C106			CC45FSL1H470J	CERAMIC 47PF J		
C107			CC45FSL1H101J	CERAMIC 100PF J		
C108			CE04FW1E220MEL	ELECTRO 22UF 25WV		
C109			CF92FV1H224J	MF 0.22UF J		
270	4B		E11-0132-05	PHONE JACK(2P)MIC L/R		
271	3C		E23-0125-05	TERMINAL GND		
272	4B		E11-0103-05	PHONE JACK(3P)		
273	3C		E13-0432-05	PHONO JACK(4P)		
L1 ,2			L39-0107-05	TRAP COIL (105KHZ)		
L3		*	L32-0304-05	BIAS OSCILATING COIL		
L4		*	L32-0305-05	BIAS OSCILATING COIL		
L5 ,6			L40-2292-14	SMALL FIXED INDUCTOR(2.2UH,M)		
E			N09-0295-05	HEXAGON HEAD BOLT(M3X8)		
CP1			R90-0286-05	MULTI-COMP 4.7KX4 J 1/6W		
CP2			R90-0233-05	MULTI-COMP 10KX4 J 1/6W		
CP3			R90-0272-05	MULTI-COMP 100KX12 J 1/6W		
CP4			R90-0291-05	MULTI-COMP 100KX4 J 1/6W		
R94			RD14GB2E6R8J	FL-PROOF RD 6.8 J 1/4W		
R96			RD14GB2E4R7J	FL-PROOF RD 4.7 J 1/4W		
R98		*	R92-0208-05	CARBON FILM RESISTOR		
R132			RS14KB3D270J	FL-PROOF RS 27 J 2W		
R151			RS14KB3A681J	FL-PROOF RS 680 J 1W		
R168			RS14KB3A470J	FL-PROOF RS 47 J 1W		
R169		*	RS14KB3D120J	FL-PROOF RS 12 J 2W		
R170		*	RS14KB3D181J	FL-PROOF RS 180 J 2W		
R171			RD14GB2E560J	FL-PROOF RD 56 J 1/4W		
R173			RS14KB3A102J	FL-PROOF RS 1.0K J 1W		
R174			RS14KB3D150J	FL-PROOF RS 15 J 2W		
R180			RD14GB2E180J	FL-PROOF RD 18 J 1/4W		
VR1	4B		R06-4061-05	POTENTIOMETER(50KX2)REC LEVEL		
VR2	4B		R01-5040-05	POTENTIOMETER(200K)REC BALANCE		
VR3	4B	*	R10-4021-05	POTENTIOMETER(PH/OUTPUT LEVEL)		
VR4 ,5			R12-5310-05	TRIMMING POT(200K) BIAS		
S1	4B		S40-2169-05	PUSH SWITCH(MPX FILTER)		
S2 -5	4B		S40-1065-05	PUSH SWITCH(STOP,REV,FWD,PAUSE		
S6 -10	4B		S40-1065-05	PUSH SW(REW,FF,REC,I.S.,B.S.)		
S11	4A		S31-2062-05	SLIDE SWITCH(TIMER)		
D1 ,2			RD8.2E(B2)	ZENER DIODE		
D3 -23			1S1555	DIODE		
D3 -23			1S2076	DIODE		
D24			RD9.1E(B2)	ZENER DIODE		
D25			1S1555	DIODE		
D25			1S2076	DIODE		
D26		*	RD4.7E(B2)	ZENER DIODE		
D27 ,28			1S1555	DIODE		
D27 ,28			1S2076	DIODE		
D29			1SS53	DIODE		
D30			RD8.2E(B2)	ZENER DIODE		
D31 -42			1S1555	DIODE		

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D31 -42			1S2076	DIODE		
D43		*	RD3.0E(B2)	ZENER DIODE		
D44			RD5.1E(B2)	ZENER DIODE		
D45			RD5.6E(B2)	ZENER DIODE		
D46			RD3.9E(B)	ZENER DIODE		
D47			RD11E(B2)	ZENER DIODE		
D48			RD5.1E(B2)	ZENER DIODE		
D49 -52			GP10D-5007L	DIODE		
D53 ,54			1S2076A	DIODE		
D55 ,56			DSM1A1	DIODE		
D57 ,58			1S1555	DIODE		
D57 ,58			1S2076	DIODE		
IC1 ,2			NJM4558D(A)	IC(OP AMP)		
IC3			M5218L	IC(OP AMP)		
IC4 ,5			AN6556	IC(OP AMP)		
IC4 ,5			M5218P	IC(OP AMP)		
IC4 ,5			NJM4558D	IC(OP AMP)		
IC6			HD14077BP	IC(EX-NOR X4)		
IC7			BA6229	IC(MOTOR DRIVER)		
IC8		*	BA6209	IC(MOTOR INVERT)		
IC9		*	UPD7528C-017	IC(MICROPROCESSOR)		
Q1 -6			2SC1845(F,E)	TRANSISTOR		
Q1 -6			2SC1980(S,T)	TRANSISTOR		
Q7			2SC1685(R,S)	TRANSISTOR		
Q7			2SC1740S(Q,R)	TRANSISTOR		
Q7			2SC945(A)(Q,P)	TRANSISTOR		
Q8			2SA1127NC(R,S)	TRANSISTOR		
Q8			2SA733(A)(Q,P)	TRANSISTOR		
Q8			2SA933S(Q,R)	TRANSISTOR		
Q9			2SC1685(R,S)	TRANSISTOR		
Q9			2SC1740S(Q,R)	TRANSISTOR		
Q9			2SC945(A)(Q,P)	TRANSISTOR		
Q10			2SA1127NC(R,S)	TRANSISTOR		
Q10			2SA733(A)(Q,P)	TRANSISTOR		
Q10			2SA933S(Q,R)	TRANSISTOR		
Q11 -15			2SC1685(R,S)	TRANSISTOR		
Q11 -15			2SC1740S(Q,R)	TRANSISTOR		
Q11 -15			2SC945(A)(Q,P)	TRANSISTOR		
Q16 ,17			2SA1127NC(R,S)	TRANSISTOR		
Q16 ,17			2SA733(A)(Q,P)	TRANSISTOR		
Q16 ,17			2SA933S(Q,R)	TRANSISTOR		
Q18 -20			2SC2060(Q,R)	TRANSISTOR		
Q18 -20			2SD863(E,F)	TRANSISTOR		
Q21 ,22			DTC114YFF	DIGITAL TRANSISTOR		
Q23 ,24			2SC1685(R,S)	TRANSISTOR		
Q23 ,24			2SC1740S(Q,R)	TRANSISTOR		
Q23 ,24			2SC945(A)(Q,P)	TRANSISTOR		
Q25			DTC114YFF	DIGITAL TRANSISTOR		
Q26 -28			2SC1685(R,S)	TRANSISTOR		
Q26 -28			2SC1740S(Q,R)	TRANSISTOR		
Q26 -28			2SC945(A)(Q,P)	TRANSISTOR		
Q29			DTC114YFF	DIGITAL TRANSISTOR		
Q30 ,31			2SA1127NC(R,S)	TRANSISTOR		
Q30 ,31			2SA733(A)(Q,P)	TRANSISTOR		
Q30 ,31			2SA933S(Q,R)	TRANSISTOR		

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Q32			2SA992(F,E)	TRANSISTOR		
Q33			2SA1127NC(R,S)	TRANSISTOR		
Q33			2SA733(A)(Q,P)	TRANSISTOR		
Q33			2SA933S(Q,R)	TRANSISTOR		
Q34 -36			2SC1685(R,S)	TRANSISTOR		
Q34 -36			2SC1740S(Q,R)	TRANSISTOR		
Q34 -36			2SC945(A)(Q,P)	TRANSISTOR		
Q37			DTC114YFF	DIGITAL TRANSISTOR		
Q38			2SC2060(Q,R)	TRANSISTOR		
Q38			2SD863(E,F)	TRANSISTOR		
Q39 ,40			2SD882*1(Q,P)	TRANSISTOR		
Q41			2SC1685(R,S)	TRANSISTOR		
Q41			2SC1740S(Q,R)	TRANSISTOR		
Q41			2SC945(A)(Q,P)	TRANSISTOR		
Q42		*	2SK301(R,S)	FET		
Q43			2SB772*1(Q,P)	TRANSISTOR		
Q44		*	2SK301(R,S)	FET		
Q45			2SB772*1(Q,P)	TRANSISTOR		
Q46			2SA1127NC(R,S)	TRANSISTOR		
Q46			2SA733(A)(Q,P)	TRANSISTOR		
Q46			2SA933S(Q,R)	TRANSISTOR		
Q47 -49		*	2SK301(R,S)	FET		
Q50			UN4111	TRANSISTOR		
DOLBY NR (X30-1140-00)						
C1 -4			CE04FW1H3R3MEL	ELECTRO 3.3UF 50WV		
C5 ,6			CE04FW1C100MEL	ELECTRO 10UF 16WV		
C7 ,8			CF92FV1H103J	MF 0.010UF J		
C9 ,10			CF92FV1H153J	MF 0.015UF J		
C11 ,12			CF92FV1H103J	MF 0.010UF J		
C13 ,14			CE04FW1C100MEL	ELECTRO 10UF 16WV		
C15 ,16			CF92FV1H124J	MF 0.12UF J		
C17 ,18			CE04FW1H010MEL	ELECTRO 1.0UF 50WV		
C19 ,20			CF92FV1H683J	MF 0.068UF J		
C21 ,22		*	CF92FV1H184J	MF 0.18UF J		
C23 ,24			CF92FV1H273J	MF 0.027UF J		
C25 ,26			CE04FW1H010MEL	ELECTRO 1.0UF 50WV		
C27 ,28			CF92FV1H683J	MF 0.068UF J		
C29 ,30		*	CF92FV1H184J	MF 0.18UF J		
C31 ,32			CF92FV1H274J	MF 0.27UF J		
C33 ,34			CF92FV1H124J	MF 0.12UF J		
C35 -38			CE04FW1HR47MEL	ELECTRO 0.47UF 50WV		
C39 ,40			CF92FV1H122J	MF 1200PF J		
C41 ,42			CF92FV1H152J	MF 1500PF J		
C43			CE04FW1A470MEL	ELECTRO 47UF 10WV		
C44			CE04FW1A470MEL	ELECTRO 47UF 10WV		
L1 ,2		*	L79-0189-05	LC FILTER B.S.F 19K,38K		
L3 ,4		*	L39-0108-05	TRAP COIL (20KHZ)		
R25 ,26		*	RN14BK2E1961FTS	RN 1.96K F 1/4W		
R27 ,28		*	RN14BK2C5111FTS	RN 5.11K F 1/6W		
R29 ,30		*	RN14BK2C4642FTS	RN 46.4K F 1/6W		
IC1		*	CX20027	IC(DOLBY B/C)		
IC2		*	CX20028	IC(DOLBY B/C)		
Q1 -4			2SC1685(R,S)	TRANSISTOR		

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Q1 -4			2SC1740S(Q,R)	TRANSISTOR		
Q1 -4			2SC2320(E,F)	TRANSISTOR		
METER AMP (X87-1020-00)						
C1 ,2			CE04FW1C100M	ELECTRO 10UF 16WV		
C3 ,4			CE04FW1H2R2M	ELECTRO 2.2UF 50WV		
C5 ,6			CE04FW1H010M	ELECTRO 1.0UF 50WV		
C7 ,8			CE04FW1C330M	ELECTRO 33UF 16WV		
VR1			R12-3057-05	TRIMMING POT(10K)		
D1 -6			1SS176	DIODE		
IC1		*	BA6138	IC(ROOT AMP)		
IC2			AN6556	IC(OP AMP)		
IC2		*	M5218P	IC(OP AMP)		
IC2			NJM4558D	IC(OP AMP)		
Q1			DTC114YFF	DIGITAL TRANSISTOR		
REC/PLAY (X87-1030-00)						
C1 ,2		*	CF92FV1H394J	MF 0.39UF J		
C3 ,4			CE04FW1C100MEL	ELECTRO 10UF 16WV		
C5 ,6			CC45FSL1H100D	CERAMIC 10PF D		
C7 ,8			CF92FV1H122J	MF 1200PF J		
C9 ,10			CF92FV1H823J	MF 0.082UF J		
C11 ,12			CE04FW1C100MEL	ELECTRO 10UF 16WV		
C13 ,14			CF92FV1H682J	MF 6800PF J		
C15 ,16			CF92FV1H222J	MF 2200PF J		
C17 ,18			CQ09FS1H101JZS	POLYSTY 100PF J		
C19 ,20			CF92FV1H562J	MF 5600PF J		
C21 ,22			CF92FV1H102J	MF 1000PF J		
C23 ,24			CF92FV1H152J	MF 1500PF J		
C25 ,26			CF92FV1H182J	MF 1800PF J		
C27 ,28			CQ09FS1H221JZS	POLYSTY 220PF J		
C29 -32			CK45FF1H103Z	CERAMIC 0.010UF Z		
C33 ,34			CE04FW1C100MEL	ELECTRO 10UF 16WV		
C35 ,36		*	CQ09FS1H391JZS	POLYSTY 390PF J		
C37 ,38			CE04FW1A221MEL	ELECTRO 220UF 10WV		
C39 ,40			CC45FSL1H330J	CERAMIC 33PF J		
C41 ,42			CF92FV1H153J	MF 0.015UF J		
C43 ,44			CE04FW1H3R3MEL	ELECTRO 3.3UF 50WV		
C45 ,46			CF92FV1H223J	MF 0.022UF J		
C47 ,48			CF92FV1H122J	MF 1200PF J		
L1 ,2			L40-2238-29	SMALL FIXED INDUCTOR(22MH,G)		
R5 ,6		*	RN14BK2C6192FTS	RN 61.9K F 1/6W		
R7 ,8		*	RN14BK2C1102FTS	RN 11.0K F 1/6W		
R11 ,12		*	RN14BK2C2612FTS	RN 26.1K F 1/6W		
R25 ,26		*	RN14BK2C1001FTS	RN 1.00K F 1/6W		
R29 ,30		*	RN14BK2C5112FTS	RN 51.1K F 1/6W		
R31 ,32		*	RN14BK2C1961FTS	RN 1.96K F 1/6W		
R41 ,42		*	RN14BK2C1470FTS	RN 147.0 F 1/6W		
R43 ,44		*	RN14BK2C1963FTS	RN 196K F 1/6W		
R45 ,46		*	RN14BK2C8251FTS	RN 8.25K F 1/6W		
VR1 -4			R12-3058-05	TRIMMING POT(20K)		
D1 ,2			1SS176	DIODE		
IC1		*	TX3010N	IC(RECORD AMP)		
IC2		*	M5220P	IC(OP AMP)		

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Q1 -4			2SC1685(R,S)	TRANSISTOR		
Q1 -4			2SC1740S(Q,R)	TRANSISTOR		
Q1 -4			2SC945(A)(Q,P)	TRANSISTOR		
Q5 ,6			2SC1685(R,S)	TRANSISTOR		
Q5 ,6			2SC1740S(Q,R)	TRANSISTOR		
Q5 ,6			2SC945(A)(Q,P)	TRANSISTOR		
CASSETTE MECHANISM (D40-0320-05)						
1	2B		A10-0792-08	CHASSIS ASSY		
5	2C		D01-0065-08	FLYWHEEL ASSY		
6	1A,1B		D03-0233-08	REEL DISK ASSY		
7	2B		D10-1372-08	LEVER(BRAKE)		
8	1B		D10-1373-08	LEVER(SWITCH)		
9	1B		D10-1374-08	LEVER(METAL SWITCH)		
10	1B		D10-1375-08	LEVER(REC (R))		
11	2B		D10-1376-08	LEVER(SWITCHOVER)		
12	1A		D10-1377-08	ARM ASSY(SW PLATE CALKED ASSY)		
13	2B		D10-1378-08	SLIDER ASSY(BRAKE PLATE)		
14	1A		D10-1379-08	SLIDER ASSY(HEAD BASE CALKED A		
15	2B		D10-1380-08	SLIDER ASSY(SLIDE LEVER ASSY)		
16	2B		D12-0106-08	CAM		
17	2B		D13-0258-08	GEAR ASSY(ROTARY)		
18	1A		D13-0259-08	GEAR(INVERT)		
19	1A		D14-0119-08	PINCH ROLLER ASSY(L)		
20	1A		D14-0120-08	PINCH ROLLER ASSY(R)		
21	2C		D16-0111-08	BELT		
22	1A		D90-0012-03	STEEL BALL(ø3)		
26	2B		E31-1618-08	CONNECTING WIRE(R/P)		
27	2B		E31-1619-08	CONNECTING WIRE(E)		
31	2B		G01-1601-08	COMPRESSION SPRING		
32	1B		G01-1602-08	COMPRESSION SPRING		
33	1A		G01-1603-08	COMPRESSION SPRING		
34	1A		G01-1604-08	COMPRESSION SPRING		
35	1A		G01-1605-08	TENSION SPRING		
36	2B		G01-1606-08	TENSION SPRING		
37	2A		G01-1607-08	TENSION SPRING		
38	2B		G01-1608-08	TENSION SPRING		
39	1B		G02-0186-08	FLAT SPRING(CASSETTE HOLD)		
40	1A		G02-0187-08	FLAT SPRING		
41	2C		G02-0188-08	FLAT SPRING(THRUST)		
42	2C		G13-0137-08	CUSHION		
43	1A		G02-0189-08	R/P HEAD HOLD PLATE		
46	2B		J25-4539-08	PRINTED WIRING BOARD(MOTOR)		
47	2B		J25-4540-08	PRINTED WIRING BOARD		
48	1A		J19-2504-08	HOLDER ASSY(HEAD)		
49	2B		J21-3531-04	MOUNTING HARDWARE(R)		
50	1A		J21-3594-08	MOUNTING HARDWARE(SPRING)		
51	1C		J21-3595-08	MOUNTING HARDWARE(SWITCH)		
52	2B		J21-3596-08	MOUNTING HARDWARE(MOTOR)		
53	2C		J21-3597-08	MOUNT HARDWARE(CAPSTAN MOTOR)		
54	1A		J21-3598-08	MOUNTING HARDWARE(E HEAD)		
55	1A		J30-0204-08	SPACER		
56	1C		J30-0205-08	SPACER		

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57	1A		J31-0247-08	COLLAR		
58	2C		J31-0183-08	COLLAR		
59	2B		J31-0245-08	COLLAR(Ø4X6)		
60	1B		J31-0246-08	COLLAR(Ø2.6X4)		
61	1A		J39-0088-08	SPACER		
62	1A		J42-0124-08	POWER CORD BUSHING(SPRING)		
-			J61-0307-05	WIRE BAND		
83	1A		N19-0334-08	FLAT WASHER(Ø1.8XØ3.2XO.5)		
84	2B		N19-0344-08	FLAT WASHER(Ø2.5XØ7XO.8)		
85	1A		N19-0907-08	FLAT WASHER		
86	1A		N19-0908-08	FLAT WASHER(Ø2.7XØ6XO.5)		
87	2C		N19-0909-08	FLAT WASHER(Ø2.6XØ4.7XO.25)		
88	2C		N19-0910-08	FLAT WASHER(Ø2.6XØ7XO.13)		
89	2B		N19-0911-08	FLAT WASHER(Ø4.1XØ5.8XO.1)		
90	1A,1B		N19-0912-08	FLAT WASHER		
F			N09-1462-08	SCREW(BLACK)SPRING		
G			N09-1463-08	SCREW(M2X10)		
H			N10-2020-46	HEXAGON NUT(M2)		
J			N09-0346-08	SCREW(M2X4)		
K			N09-1228-08	SCREW(M2.5X5)		
L			N09-1233-08	SCREW		
M			N09-1241-08	SCREW(M2X3)		
N			N09-1244-08	SCREW		
P			N09-1453-08	SCREW(TAPTITE,Ø2.5X8)		
Q			N09-1454-08	SCREW(TAPTITE,Ø2.5X6)		
R			N09-1455-08	SCREW(TAPTITE,Ø2.6X10)		
S			N09-1456-08	SCREW(TAPTITE)		
T			N09-1457-08	SCREW(M2.6X14)		
U			N29-0208-04	E RING(E3)		
V			N29-0219-05	RETAINING RING(CS2)		
W			N29-0220-05	RETAINING RING(CS2.4)		
97	1B		S46-1050-08	LEAF SWITCH		
98	1B		S46-1051-08	LEAF SWITCH		
99	2C		S46-1052-08	LEAF SWITCH(REVERSE-REC)		
100	2B		S46-1053-08	LEAF SWITCH(E HEAD SWITCHOVER)		
104	1A		T32-0307-05	ERASE HEAD		
105	1A		T34-0309-05	REC/PLAY HEAD		
106	2B		T42-0061-08	DC MOTOR ASSY		
107	2B		T42-0062-08	DC MOTOR ASSY		
108	2C		T42-0063-08	DC MOTOR ASSY		
109	1A		T95-0025-08	PHOTO REFLECTOR		
113	1B		W02-0633-08	ELECTRIC UNIT		

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Note :
Component and circuitry are subject to modification to insure best operation under differing local conditions. This manual is based on, the U.S.A. (K) standard, and provides information on regional circuit modification through use of alternate schematic diagrams, and information on regional component variations through use of parts list.

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